## Appendix A

## Testing Procedures and Measurement Frequency/Protocol

### A-3

### Appendix A

## **Testing Procedures and Measurement Frequency/Protocol**

Table A-1. Measurements for cold bench-scale tests—chemical oxidation.

Measurement/Observation	Traceability to Test Objectives	Matrix	Sample Frequency	Sample Location	Proposed Method
Weight of reaction flask	TO 2	N/A	Before test	Reaction flask	Balance
Weight of surrogate components	TO 2	Liquid/solid	Before addition to reaction flask	Weighing paper/bottle	Balance
VOCs in surrogate	TO 2	Surrogate emulsion	After surrogate is generated	Surrogate storage container	Gravimetric determination
SVOCs in surrogate	TO 2	Surrogate emulsion	After each batch of surrogate is generated	Surrogate storage container	Gravimetric determination
PCBs in surrogate	TO 2	Surrogate emulsion	After each batch of surrogate is generated	Surrogate storage container	Gravimetric determination
Metals in surrogate	TO 2	Surrogate emulsion	After each batch of surrogate is generated	Surrogate storage container	Gravimetric determination
Mercury in surrogate	TO 2	Surrogate emulsion	After each batch of surrogate is generated	Surrogate storage container	Gravimetric determination
Initial volume of surrogate	TO 2	Surrogate emulsion	Before test	Reaction flask	Graduated cylinder
Initial weight of surrogate	TO 2	Surrogate emulsion	Before test	Reaction flask	Balance
Temperature of fluid bath/ temperature of fluid entering flask jacket	TO 3	Liquid	Every 15 minutes during test	Fluid bath readout/thermometer in fluid bath	Thermometer
Temperature of water exiting flask jacket	TO 3	Liquid	Every 15 minutes during test	Exit of flask fluid jacket at return to bath	Thermometer
Flow rate of fluid circulating through jacket	TO 3	Liquid	Before each test	Fluid exiting flask into bath	Graduate cylinder/stopwatch
Temperature of cooling water at reflux condenser inlet	TO 3	Liquid	Every 15 minutes during test	Reflux condenser inlet	Thermometer

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Table A-1. (continued).

Measurement/Observation	Traceability to Test Objectives	Matrix	Sample Frequency	Sample Location	Proposed Method
Temperature of cooling water at reflux condenser outlet	TO 3	Liquid	Every 15 minutes during test	Reflux condenser outlet	Thermometer
Flow through reflux condenser	TO 3	Liquid	Before each test	Fluid exiting fluid bath	Graduate cylinder/stopwatch
pH in reaction flask	TO 10	Surrogate emulsion	While adding acid to adjust pH, every 5 minutes during test duration, every minute during excursions	Two probes in reaction flask	pH meter
Temperature in reaction flask	TO 10	Surrogate emulsion	While adding acid to adjust pH, every 5 minutes during test duration, every minute during excursions	Two probes in reaction flask	Thermistor in pH meter
Chloride ion	TO 10	Surrogate emulsion	End of test	Reaction flask	ISE for chloride
Oxidizer flow rate	TO 2, TO 7, TO 8	Liquid	Every 15 minutes during test	Syringe pump	Syringe pump readout
Time interval for each oxidizer flow rate change	TO 2, TO 7, TO 8	N/A	Each time oxidizer flow rate changes	Laboratory clock	Difference in time from interval start to finish
Additions of other reagents to reaction flask (pH adjusters/catalysts, etc.)	TO 2	Liquid/solid	Before every addition, determine weight added.	Transfer container	Balance
Noncondensable gas flow rate at outlet of Dewar condenser	TO 4, TO 9	Gas	Every 10 minutes during test	Bubble meter at apparatus outlet	Bubble meters and mass flow meter
Gas at outlet of Dewar condenser	TO 4, TO 9	Gas	Every 10 minutes during test	Bubble meter at apparatus outlet	Thermocouple
Barometric pressure	TO 3	Air	Daily during testing	Laboratory barometer	Barometer
Ambient temperature	TO 3	Air	Daily during testing	Laboratory thermometer	Thermometer

Table A-1. (continued).

Measurement/Observation	Traceability to Test Objectives	Matrix	Sample Frequency	Sample Location	Proposed Method
Gas composition	TO 4, TO 9	Gas	Every 15 minutes during test or more frequently, if possible	Septum at outlet of reflux condenser	EPA Method 18 GC/TCD or GC/MS
Noncondensable gas composition	TO 4, TO 9	Gas	Every 15 minutes during test	Septum at outlet of Dewar condenser	EPA Method 18 GC/TCD or GC/MS
Time to complete test	TO 2, TO 7	N/A	Record the time of test start and finish.	Laboratory clock	Difference in time to nearest minute
Final weight of condensate	TO 4, TO 9	Liquid	After test	Condenser receiving flask	Gravimetric determination
Final weight of surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask contents	Gravimetric determination
Final volume of surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask contents	Graduated cylinder
VOCs in surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask	SW-846 8260B
SVOCs in surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask	SW-846 8270C
PCBs in surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask	SW-846 8082
Metals in surrogate reaction products	TO 2, TO 7	Reacted surrogate from definitive runs	After test	Reaction flask	SW-846 3050B and 6010B
Mercury in surrogate reaction products	TO 2, TO 7	Reacted surrogate	After test	Reaction flask	SW-846 7470
DRE	TO 2, TO 7, overall objective	N/A	After test	N/A	Calculation from initial and final concentrations of CFTs
Condensate composition	TO 4, TO 9	Condensate	After test	Condenser receiving flask	SW-846 8260B
Weight of reaction flask	TO 2	N/A	After decanting contents of flask	Reaction flask after test	Gravimetric determination

Table A-2. Measurements for corrosion tests.

Measurement/Observation	Traceability to Test Objectives	Matrix	Sample Frequency	Sample Location	Proposed Method
Initial weight of coupon	TO 5	Solid	Before adding to reaction flask	Material coupons	Gravimetric determination
Final weight of coupon	TO 5	Solid	After corrosion test	Material coupons	Gravimetric determination
Visual inspection/photographing coupons	TO 5	Solid	Before/after corrosion test	Material coupons	Visual

Table A-3. Measurements for bench-scale cold tests—stabilization of reaction products.

Measurement/Observation		aceability to st Objectives	Matrix	Sample Frequency	Sample Locat	tion Proposed Method
Storage/cure temperature	LDR	achievement	Stabilized, reacted surrogate	Daily during cure time	Water bath	Water bath/thermometer
Storage/cure time	LDR	achievement	Stabilized, reacted surrogate	Elapsed time for curing	Laboratory clock	Laboratory clock
Ratio of waste to grout	LDR	achievement	Stabilized, reacted surrogate	While preparing stabilized, reacted product	Grout mixing con	ntainer Gravimetric determination/calculation
TCLP Metals (Cr and Hg)	UTS	for disposal	Stabilized, reacted surrogate	After 7-day cure	Cured grout	SW-846 1311
Paint filter test	aint filter test ICDF was acceptance		Stabilized, reacted surrogate from definitive runs	After 30-day cure	Cured grout	SW-846 9095
Compressive strength		waste tance criteria	Stabilized, reacted surrogate from definitive runs	After 30-day cure	Cured grout	Handheld penetrometer
CFT = contaminant for treatment. DO = dissolved oxygen. DRE = destruction and removal efficie EPA = U.S. Environmental Protection		GC = gas chroma ICDF = INEEL C ISE = ion selectiv LDR = land dispo	CERCLA Disposal Facility. ve electrode.	MS = mass spectrometer PCB = polychlorinated b SVOC = semivolatile org TCD = thermal conducti	oiphenyl. ganic compound.	TCLP = toxicity characteristic leaching procedure.  TO = test objective.  UTS = universal treatment standard.  VOC = volatile organic compound.

# Appendix B Computational Methods and Examples

#### Appendix B

#### **Computational Methods and Examples**

#### TO 2: Determine Conversion Extent of CFT Destruction

The conversion of the contaminants for treatment (CFTs) is only partially determined by the data available from the test results. DRE, destruction-removal efficiency, is easily determined, although not with a high degree of precision, by comparing the mass of each CFT in the product slurry with that charged to the reaction flask.

For example, in Run F9a, the CFTs are trichloroethylene (TCE) tetrachloroethylene (PCE), trichloroethane (TCA), bis-ethylhexylphthalate (BEHP), hexachlorobenzene (HCB), and biphenyl (BP). Hexachlorobenzene and biphenyl are substitutes for Arochlor 1260 in most of the runs; however, in the final formal runs Arochlor is added to the reaction flask, also.

As calculated in the Excel spreadsheet used to enumerate the results of each formal test (surrogateSTK.xls), the formula for DRE calculation is:

$$DRE = 100\% (1 - M_{CFT} / M_{CFT})$$

 $M_{\text{CFT}}$  is the mass of the compound in the products of the reaction. The mass is determined by the concentration of compound as analyzed by BWXT and by the mass of the product slurry as measured by MSE Technology personnel:

$$M_{CFT} = [CFT] M_f / (1,000 gm/kg)$$

The concentration of the contaminant of concern, [ CFT ], is in units of milligram of compound per kilogram of final product (mg/kg) in the Excel spreadsheet. The mass of the product slurry,  $M_f$ , is in grams. The reported quantity of the CFT is in units of total milligram in the product slurry.

 $M_{CFT\,i}$  is the amount of the compound charged to the reaction flask. Each volatile and semivolatile compound that is charged to the reaction flask is weighed on an analytical balance using weighing paper, weighing boats or microliter syringes.

The DRE determination for each CFT is then based on the weight charged to the reaction flask, the final product weight and the analysis of the compound ( $ppm_w$ ) in the product slurry. The equation expressing this result is, then:

DRE = 
$$100\% \{1 - ([CFT] M_f / (1,000 gm/kg)) / M_{CFT_i} \}$$

For semivolatile compounds, the above equation calculates both the DRE and percent conversion of the compound during the course of reaction. For volatile compounds, the equation calculates the DRE, but, not necessarily, the conversion by reaction. Conversion of volatile compounds has to take into account the loss of volatiles from the reaction flask by volatilization.

Test MV, the method validation test, reported DREs for TCE of 99.98%, for PCE of 99.6% and for TCA of 99.7%. The method validation test heated the standard reaction flask charge to 80°C for 8 hr. No peroxide was added to the flask during Test MV; oxygen was bubbled through the flask at about 200 accm.

Test MV showed that the volatile compounds would leave the reactor, and that DRE essentially consists of volatilization. The sparse GC/MS results available for runs F-6 ( $40^{\circ}$ C,  $500 \text{ mL H}_2\text{O}_2$ ) and F-13 ( $40^{\circ}$ C,  $400 \text{ mL H}_2\text{O}_2$ , 12 hr) and F-21 ( $80^{\circ}$ ,  $250 \text{ mL H}_2\text{O}_2$ , 8 hr) indicate that the volatiles occur at low, consistent concentrations in the off-gas throughout the  $40^{\circ}$ C runs; but appear in high concentrations early in the  $80^{\circ}$ C test and diminish rapidly as the run proceeds.

#### **Uncertainty Analysis**

For a result "r," calculated by a function such as r = r(x, y, z), the general method for determining uncertainty in the result is<sup>a</sup>:

$$[U_r]^2 = [(\partial r/\partial x) U_x]^2 + [(\partial r/\partial y) U_y]^2 + [(\partial r/\partial z) U_z]^2$$

Where  $U_r$  is the uncertainty in the result and  $U_x$ ,  $U_y$  and  $U_z$  are the respective uncertainties in the independent variables.

The equation for the DRE is rewritten below to facilitate error analysis:

$$1 - DRE = ([CFT] M_f / (1,000 \text{ gm/kg})) / M_{CFT_i}$$

The partial derivatives for the right hand term are:

$$(\partial [1 - DRE] / \partial [CFT]) = M_f / (1,000 \text{ gm/kg}) / M_{CFT_i}$$

$$(\partial [1 - DRE] / \partial M_f) = ([CFT] / (1,000 \text{ gm/kg})) / M_{CFT_i}$$

$$(\partial (1 - DRE) / \partial M_{CFTi}) = -(M_f [CFT] / (1,000 gm/kg))/(M_{CFTi})^2$$

The uncertainty equation then becomes:

$$U_{(1-DRE)}^{2} = \{U_{[CFT]}/M_{f}/(1,000 \text{ gm/kg}))/M_{CFT}I\}^{2}$$

$$+ \{U_{Mf}/([CFT]/(1,000 \text{ gm/kg}))/M_{CFT}I\}^{2}$$

$$+ \{M_{CFT}I)^{2}\}^{2}$$

Dividing through the left hand side of the uncertainty equation by:

$$[1 - DRE]^2$$

and the right hand side by:

$$\{[CFT] M_f/(1,000 \text{ gm/kg})/M_{CFT_i}\}^2$$

simplifies the expression to:

$$\{U_{(1-DRE)}/(1-DRE)\}^2 = \{U_{[CFT]}/[CFT]\}^2 + \{U_{Mf}/M_f\}^2 + \{M_{CFTI}/M_{CFTI}\}^2$$

a. Experimentation and Uncertainty Analysis for Engineers; Hugh W. Coleman, W. Glen Steele, Jr.; John Wiley and Sons; 1989.

The above-simplified form of the uncertainty equation will be used for the succeeding sections of this report without derivation.

The following are the estimated uncertainties of the independent variables:

$$\begin{split} &U_{\text{[CFT]}}/[\text{CFT}] = \pm \ 20\% = 0.2 \\ &U_{Mf} = \pm \ 0.1 \ \text{g/2} \\ &M_f = 619.4 \ \text{g [test F-16 (80^\circ, 500 \ \text{mL H}_2\text{O}_2, 12 \ \text{hr})]} \\ &U_{Mf}/M_f = \pm \ 0.05/619.4 = 80.7 \ \text{E-6} \\ &U_{M\,\text{CFT}\,I} = \pm \ 0.0001 \ \text{g/2} \\ &M_{\,\text{CFT}\,I} = \pm \ 0.1656 \ \text{(TCE, test F-16)} \\ &U_{M\,\text{CFT}\,I}/M_{\,\text{CFT}\,I} = \pm \ 0.00005 \ / \ .1656 = 302 \ \text{E-6} \\ &\{U_{(1-\text{DRE})}/\ (1-\text{DRE})\}^2 = \{0.2\}^2 + \{\ 80.7 \ \text{E-6}\}^2 + \{302 \ \text{E-6}\}^2 = 40.0 \ \text{E-3} = 0.04 \end{split}$$

The final estimate of the uncertainty of the DRE calculation pretty much shows that the entire uncertainty is due to the uncertainty of the chemical analyses, or about  $\pm 20\%$ .

#### TO 3: Estimate the Rate of Heat Generation

In order for the contents of the reaction flask to stay at a steady temperature, heat generated by reaction, and heat added by the silicon oil, has to be lost through the reflux condenser and the glass surface of the flask. The energy of the flask contents is also slightly affected by the enthalpy of the peroxide stream entering the flask, and the enthalpy of the vapor stream leaving it.

The following defines the variables used in determining the heat balance:

 $\Delta$ Hg: heat generated by reaction in the flask in calories per minute;

 $\Delta$ Ho: enthalpy lost by the silicone oil as it is pumped through the flask;

 $\Delta$ Hcw: enthalpy gained by the condenser water in calories per minute;

 $\Delta$ Hp: enthalpy gained by the peroxide entering the flask;

 $\{U_{(1-DRE)}/(1-DRE)\} = (0.04)^{0.5} = 0.2 = 20\%$ 

 $\Delta$ Hog: enthalpy of the gas leaving the reflux condenser;

Qc: heat lost by the gas as it transits the reflux condenser;

Qtt: total heat lost by the flask through its surface.

Qtc: convective heat loss from the top, unjacketed half of the flask;

Qbc: convective heat loss from the bottom-jacketed-half of the flask;

Otr: radiative heat loss from the top of the flask;

Obr: radiative heat loss from the bottom of the flask;

Ta: ambient room temperature;

Toi: silicone oil temperature from the oil heater;

Tor: silicone oil return temperature;

Tci: condenser water inlet temperature;

Tcr: condenser water return temperature;

Tt: flask top half surface temperature;

Tb: flask bottom half surface temperature.

Mo: silicone oil flow rate;

Mc: condenser water flow rate;

Mp: peroxide flow rate;

Mog: reflux exit gas flow rate;

Yog: volume percent water vapor in the reflux exit gas;

Cw: water specific heat;

Co: silicone oil specific heat;

 $\Delta H_{H2O}$ : latent heat of water vaporization.

The following equates the energy generated by reaction, and the energy transferred into the flask by the silicone oil and by the hydrogen peroxide, to the energy lost by convection and radiation from the surface of the flask and by transport of vapor from the flask:

$$\Delta$$
Hg +  $\Delta$ Ho +  $\Delta$ Hp = Qtt + Qc +  $\Delta$ Hog

The overall heat balance can be rewritten as:

$$\Delta Hg = -\Delta Ho - \Delta Hp + Qtt + Qc + \Delta Hog$$

The enthalpy change of the oil ( $\Delta$ Ho) is negative since the oil cools. The oil enthalpy change is calculated by:

$$\Delta$$
Ho = Mo Co (Tor-Toi)

The enthalpy change of the condenser water ( $\Delta Hcw$ ) is a positive number, since the water heats up. The condenser water enthalpy change is subtracted from the energy in the flask since it represents heat taken away from the flask, or,  $Qc = -\Delta Hcw$ . The heat taken away from the flask is due to cooling of the non-condensable gas formed by reaction and by condensing the water vaporized into the gas stream. For the purpose of this analysis, it is assumed that the gas will be saturated by water vapor as it exits the reflux condenser at the temperature indicated at sample port "P2" of the glassware apparatus (Figure 2-1). The amount of heat transferred to the condenser water is:

$$\Delta Hcw = Mc Cw (Tcr - Tci)$$

The exit gas from the reflux condenser has been cooled to the point of having near zero enthalpy; however, there is a certain fraction of water that has vaporized into it. The energy leaving the flask due to water evaporation is accounted for by:

$$\Delta Hog = Yog Mog \Delta H_{H2O} / 31.3 g/gmol$$

An average molecular weight of 31.3 has been estimated for the exit gas, based on it being mostly oxygen with about 5% water vapor as its main constituents.

The total heat loss through the glass surface of the flask is equal to the convective loss and radiative losses from the top of the flask, which are a function of the surface temperature of the glass, and the corresponding losses through the outer surface of the heating jacket, which are a function of the surface temperature of that portion of the flask, or:

$$Qtt = Qtc + Qtr + Qbc + Qbr$$

Several approaches to estimating the heat loss from the flask were made. The method validation test that was run on 21 July included all components of the surrogate but no peroxide injection; thus, any heat added to the system by the silicone oil had to be lost through the reflux condenser and glass surfaces of the flask. There should be no term for heat generation by reaction.

The upper and lower glass surface areas of the flask were estimated, and convection and radiation equations written to attempt to correlate the losses. Mathcad was used to estimate the losses. The Mathcad calculations used the surface temperatures of the flask and the ambient air temperature to estimate the heat losses. The convective heat transfer coefficient was the only correlating variable.

The heat loss equations were added to the Excel spreadsheet used to reduce the run data. It was eventually determined that a value of the convective coefficient of about 2.75 Btu/hr/ft²/°F provided a near fit to the data from the final few tests.

On the  $7^{th}$  and  $12^{th}$  of August, further attempts were made to correlate the heat loss from the reaction flask. In these tests, 500 mL of water was placed in the flask and the silicone oil used to heat it. The water to the reflux condenser cooled any resulting vapor.

The data from the heat loss runs were correlated with a linear least squares program against both oil bath temperature (Toi) and oil bath temperature minus ambient temperature (Toi – Ta). Both correlated with an r = 0.99.

The resulting correlations were:

Qtt = 
$$66.48$$
 (Toi – Ta) –  $411.25$  cal/min, with T in °C

$$Qtt = 66.52 \text{ Toi} - 2324.54 \text{ cal/min}$$

At 100°C oil temperature and 25°C ambient temperature, the above correlations predict a heat loss of 4,330 and 4,570 calories per minute, respectively.

The heat losses from the correlations were used to find a heat transfer coefficient for Run F16 that would match the heat losses from the glassware in the heat loss tests. The average heat transfer coefficient for F-16 was 2.74.

#### **Uncertainty Analysis**

The uncertainty analysis for the generation of energy by the reaction system follows the method explained above. For the heat transferred to the flask by the silicone oil:

#### 1. $\Delta$ Ho = Mo Co (Tor-Toi)

the uncertainty equation becomes:

$$[U\Delta Ho / \Delta Ho]^2 =$$

$$[U_{Mo} / Mo]^2 + [U_{Co} / Co]^2 + [U_{Tor} / (Tor-Toi)]^2 + [U_{Toi} / (Tor-Toi)]^2$$

For Run F-16 (80°C, 500 mL  $H_2O_2$ , 12 hr), the estimated values of uncertainty and values of the variables are:

$$U_{Mo} / Mo = (5 \text{ mL/min}) / 621 \text{ (mL/min)}$$

$$U_{Co} / Co = (0.15 \text{ cal/g/}^{\circ}\text{C}) / (0.4 \text{ cal/g/}^{\circ}\text{C})$$

$$U_{Tor} / (Tor-Toi) = (3^{\circ}C) / (19.2^{\circ}C)$$

$$U_{Toi} / (Tor-Toi) = (0.5^{\circ}C) / (19.2^{\circ}C)$$

The above values give an uncertainty of the heat transferred from the oil of:

$$[U\Delta Ho / \Delta Ho] = 0.408 = 41\%$$

The major uncertainty, as can be seen above, is in the heat capacity of the silicone oil. All the company contacts and literature inspected to date has not shed light on the heat capacity at temperatures around 80 to 100°C for the BOSS DS fluid used in the constant temperature bath. Further work along this topic requires that we replace the BOSS oil with one that has documented physical properties.

#### 2. $\Delta Hcw = Mc Cw (Tcr - Tci)$

The heat capacity of water, Cw, is a known quantity, so the uncertainty equation need not address it, and becomes:

$$[U\Delta_{Hew} / \Delta Hew]^2 = [U_{Me} / Me]^2 + [U_{Ter} / (Ter - Tei)]^2 + [U_{Tei} / (Ter - Tei)]^2$$

$$[U_{Mc} / Mc] = (5 \text{ mL/min}) / (1,069 \text{ mL} / \text{min})$$

$$[U_{Ter} / (Ter - Tei)] = (0.5^{\circ}C) / (1.9^{\circ}C)$$

$$[U_{Tci}/(Tcr - Tci)] = (0.5^{\circ}C)/(1.9^{\circ}C)$$

the estimate of the uncertainty involved in the heat transferred to the reflux condenser is:

$$[U\Delta_{Hew} / \Delta Hew] = 37\%$$

This uncertainty is due to the very low temperature difference of the cooling water caused by the condenser being pinched because of concurrent flow.

#### 3. $\Delta Hp = Mp C (Ta - Tr)$

The change in enthalpy of the peroxide is of the same form as the condenser water, so, by inspection, the uncertainty is:

$$[U_{\Delta Hp} / \Delta Hp]^2 = [U_{Mp} / Mp]^2 + [U_{Ta} / (Ta - Tr)]^2 + [U_{Tr} / (Tr - Ta)]^2$$

 $[U_{Mp} / Mp] = [0.001 \text{ mL/min} / 2 \text{ mL/min}]$ 

$$[U_{Ta}/(Ta-Tr)] = [0.5^{\circ}C/(91.5-25)^{\circ}C]$$

$$[U_{Tr}/(Tr-Ta)] = [0.2^{\circ}C/(91.5-25)^{\circ}C]$$

$$[U_{\Delta Hp} / \Delta Hp] = 2.38 \%$$

#### 4. $\Delta \text{Hog} = \text{Yog Mog } \Delta H_{\text{H2O}} / 31.3 \text{ g/gmol}$

The latent heat of water is known, so the uncertainty equation becomes:

$$[U_{\text{Hog}} / \text{Hog}]^2 = [U_{\text{Yog}} / \text{Yog}]^2 + [U_{\text{Mog}} / \text{Mog}]^2$$

$$[U_{Yog} / Yog] = (0.4 \text{ psia} / 12.1 \text{ psia}) = 3.3\%$$

 $[U_{Mog} / Mog] = 2.4\%$  (see the next section on TO-4)

$$[U_{Hog} / Hog] = 4.1\%$$

5. 
$$Qtt = Qtc + Qtr + Qbc + Qbr$$

$$Qtc = Uo A1 (Ts - Ta)$$

$$[U_{\text{Qtc}} / \text{Qtc}]^2 = [U_{\text{Uo}} / \text{Uo}]^2 + [U_{\text{A1}} / \text{A1}]^2 + [U_{\text{Ts}} / (\text{Ts} - \text{Ta})]^2 + [U_{\text{Ta}} / (\text{Ts} - \text{Ta})]^2$$

$$[U_{Uo} / Uo] = (0.8 \text{ Btu/hr/ft}^2/^{\circ}F) / (2.75 \text{ Btu/hr/ft}^2/^{\circ}F) = .291 = 29\%$$

$$[U_{A1} / A1] = 15\%$$

$$[U_{Ts}/(Ts-Ta)] = (3^{\circ}C/48.9C^{\circ}) = 6.1\%$$

$$[U_{Ta}/(Ts-Ta)] = (3^{\circ}C/48.9C^{\circ}) = 6.1\%$$

$$[U_{Qtc} / Qtc] = 33.8\%$$

The majority of the uncertainty in the quantity of heat lost by convection from the top of the flask is due to the uncertainty in the heat transfer coefficient and the uncertainty in the irregular area of the surface of the flask.

Qtr = 
$$0.1713 \epsilon \text{ A1} [(\text{Ts}/100)^4 - (\text{Ta}/100)^4]$$

$$[U Qtr / Qtr]^2 = [U \epsilon / \epsilon]^2 + [U A1 / A1]^2$$

+ 
$$[(Uts/100) (Ts/100)^3 / [(Ts/100)^4 - (Ta/100)^4])]^2$$

+ 
$$[-(Uta/100) (Ts/100)^3 / [(Ts/100)^4 - (Ta/100)^4])]^2$$

$$[U \epsilon / \epsilon] = (0.05)$$

$$[U A1 / A1] = (0.15)$$

$$[(\text{Uts/100}) (\text{Ts/100})^3 / [(\text{Ts/100})^4 - (\text{Ta/100})^4]] = 220 \text{ E} -6$$

$$[(\text{Uta}/100) (\text{Ts}/100)^3 / [(\text{Ts}/100)^4 - (\text{Ta}/100)^4]] = -65.5 \text{ E} -6$$

$$[U Qtr / Qtr] = 15.9\%$$

The uncertainty of the transfer of heat from the flask by radiation is controlled by the uncertainty of the area estimate almost wholly.

The values for the bottom of the flask, Qbc and Qbr are assumed to be the same as those calculated for the top of the flask. Therefore, for:

$$Qtt = Qtc + Qtr + Qbc + Qbr$$

$$[U_{Ott} / Qtt]^2 = [U_{Otc} / Qtc]^2 + [U_{Otr} / Qbr]^2 + [U_{Obc} / Qbc]^2 + [U_{Obr} / Qbr]^2$$

$$[U_{Ott} / Qtt] = 52.8\%$$

6. 
$$\Delta Hg = -\Delta Ho - \Delta Hp + Qtt + Qc + \Delta Hog$$

$$[U_{\Delta Hg}/\Delta Hg]^2 =$$

$$[U_{\Delta Ho}/\Delta Ho]^2 + [U_{\Delta Hp}/\Delta Hp]^2 + [U_{Ott}/Qtt]^2 + [U_{Oc}/Qc]^2 + [U_{\Delta Hog}/\Delta Hog]^2$$

 $[U_{\Delta Ho}/\Delta Ho] = 0.41$ 

$$[U_{\Delta Hp} / \Delta Hp] = 0.023$$

$$[U_{Ott}/Qtt] = 0.53$$

$$[U_{Qc}/Qc] = 0.37$$

$$[U_{\Delta Hog}/\Delta Hog]^2 = 0.041$$

$$[U_{\Delta Hg}/\Delta Hg] = 77\%$$

The analysis above forces the conclusion that we have virtually no certainty of the heat generated by reaction based on the method employed. The major components of uncertainty are the heat added by the oil (because of its unknown heat capacity), and the subsequent heat losses through the reflux condenser and the walls of the flask. The heat losses through the walls of the flask are not truly independent since these losses are calculated from the heat added by the oil and, therefore, are correlated to the heat added by the oil. Since the uncertainty of the heat lost is correlated to the heat added, the overall error above may be estimated high. However, there is no reason to further quantify the error since, as has been stated, the estimated heat generation rate is much greater than the heat that should be generated as calculated by thermodynamics. The only conclusion that can be drawn at this point is that the heat generated by reaction should be less than that measured in the current apparatus.

#### TO 4: Estimate the Bulk Gas Generation Rate

The bulk gas generation rate, Mog, defined as the reflux exit gas flow rate in the previous section, is determined using a "bubble-meter" and a stopwatch.

We use bubble meters graduated in 0 to 50 mL, or 0 to 10 mL, depending on the flow rate of gas from the reaction flask. If the volume measured is designated, Vog, and the time measured by the stopwatch is  $\Delta\theta$ , the grams per minute flowing from the reaction flask is calculated as:

$$Mog = Vog \rho_{og} / \Delta\theta$$

A density measurement,  $\rho_{og}$ , is required to convert the calculated accm to a mass flow rate. The ideal gas law is used along with the absolute pressure, room temperature and the estimated gas molecular weight. The Excel spreadsheet uses the measured or estimated gas composition to estimate the molecular weight. The final density equation is then:

$$\rho_{og} = Pa Mw/(R Ta)$$

with Pa and Ta indicating the absolute pressure and temperature, respectively, and R being the gas constant.

The mass flow equation is then, when put together:

$$Mog = Vog Pa Mw_{og} / (R Ta \Delta\theta)$$

The mass flow is a point value and is measured with the bubble meter every 15 min throughout each test run. To determine the total mass of gas from the reaction, each succeeding point value is averaged with the immediately previous point value and multiplied by the time interval between them. The calculated mass of gas between every 15 min time interval is then added to the previous sum to "integrate" the rate versus time curve.

#### **Uncertainty Analysis**

The reduced uncertainty equation is:

$$Mog = Vog Pa Mw_{og} / (R Ta \Delta\theta)$$

$$[U_{\rm Mog} / Mog]^2 = [U_{\rm Vog} / Vog]^2 + [U_{\rm Pa} / Pa]^2 + [U_{\rm MWog} / Mwog]^2 + [U_{\rm TA} / TA]^2 + [U_{\Delta\theta} / \Delta\theta]^2$$

The estimated uncertainties and absolute values from Run F-16 (80°C, 500 mL H<sub>2</sub>O<sub>2</sub>, 12 hr) are listed below:

$$U_{Vog}/Vog = 0.05 \text{ mL}/50 \text{ mL}$$

$$U_{Pa}/Pa = 0.005 \text{ psi} / 12.08 \text{ psia}$$

$$U_{MWog}/Mwog = (0.6 \text{ g/gmol}) / (31.3 \text{ g/gmol})$$

$$U_{TA}/TA = 3C^{\circ} / 293 \text{ K}$$

$$U_{\Delta\theta}/\Delta\theta = 0.02 \text{ sec} / 7.02 \text{ sec}$$

The above numbers give an estimated uncertainty for the bulk gas generation rate of:

$$U_{\text{Mog}}$$
 / Mog =  $\pm 2.4\%$ 

#### TO 9: Determine the Behavior of VOCs in the Off-gas

The mass of volatiles exiting the reaction flask through the off-gas is estimated by multiplying the volume fraction of the particular compound (as measured by GC/MS) by the molar flowrate of the offgas. This product is then multiplied by the molecular weight of the compound. The total mass of each compound is then calculated by integrating the point values as described above.

$$M_{\rm cft} = [CFT] Mog Mw_{\rm cft} / Mw_{\rm og}$$

#### **Uncertainty Analysis**

$$\begin{split} &\{U_{\rm M\,[CFT]}\,/\,\,[CFT]\}^2 = \{U_{\,\,[CFT]}\,/\,\,[CFT]\}^2 + [U_{\,\,{\rm Mog}}\,/\,\,Mog]^2 + [U_{\,\,{\rm Mwog}}/\,\,Mw_{og}]^2 \\ &\{U_{\,\,[CFT]}\,/\,\,[CFT]\}^2 = [0.4\,\,]^2 \end{split}$$

The other two values have been determined in the previous section, giving an overall uncertainty for VOCs in the off-gas of about,

$$\{U_{M[CFT]} / [CFT] \} = 40.1\%$$

## Appendix C Test Run Summaries

S Kujawa					_					
7/22/2003					R	eactor Char	ge			
					L					
TEST RUN	MV-1									
			SURROG	ATE		Target			Actual	
Component					Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
	Charge:				150					
water					120.0442	120.04		120.072		
hydraulic oil					2.0938	2.38		2.013		
cutting oil					2.0938	2.38		2.024		
IsoOctane								none		
Al2O3					0.3349	0.08	83.9	0.335		
CaO					0.5413	0.16	163.0	0.540		
Cr2O3					0.2326	0.04	44.6	0.231		
Fe2O3					1.3032	0.44	435.1	1.304		
MgO					0.7269	0.38	375.9	0.727		
MnO					0.4254	0.08	82.1	0.427		
SiO2					8.3907	3.71	3712.7	8.391		
Na3PO4					12.2584	4.83	4831.8	12.258		
кон					0.3224	0.16	157.8	0.325		
Hg					0.0516	0.00	3.8	0.0542		
Aroclor-1260		Number of	Vials:					none		
TCE					0.8431	0.58	577.5	0.843		
PCE					0.0747	0.05	45.8	0.073		
TCA					0.0941	0.07	70.2	0.093		
BEHP					0.1619	0.17	165.2	0.130		
	Total:				150.0	135.55		150		
								, , , , , , , , , , , , , , , , , , ,		
			REAGEN1	ΓS						
Component					Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Component										
нсв					0.0056			0.006		
BP				1	0.0029			0.003		
					0.0020			2.000		
FeSO4 7H2O					1.5			1.499		
. 550 1 11120					1.0					
H2O2 (50%)					0			0	0	
					U					
H2SO4 (con)								11.898		
2004 (0011)								11.000		
NaOH (4 M)								1.840		
Oxygen:	Set Point:	0.2	lpm	Run Dur.:	481.0	Minutes		126		
OA ygon.	Total:	J.2	ipin	Kun Dul	151.5	MILITATOS		291		-

	S Kujawa												
	7/23/2003				Gas	Phase	$\overline{}$						
	112312003					a/Calculation	.n.						
	TEST RUN	MV			Dat	a/Calculation	ons I						
	TEOT KON	1010											
	Results		Gas Phase	Calculation	ons								
Run Time	Gas Vol, cc	Time, sec	accm	Temp, F	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum	Rctr T
					psia		lb/ft^3	0	min.	gm/min	gm	gm	Deg C
12:04					w are dumr			0					
12:05	50	14.88	202	87	12.2	31.3	0.065	0.210	1.0	0.105	0.105		76.8
12:10				87	12.2	31.3	0.065	0.000	5.0	0.105	0.526		76.8
12:20		29.25		87	12.2	31.3		0.107	10.0	0.053	0.535	1.2	76.8
12:35	50	25.75		87	12.2	31.3		0.122	15.0	0.114	1.714	2.9	78.5
12:50	50	14.72		87	12.2	31.3	0.065	0.213	15.0	0.167	2.506	5.4	78.9
13:05	50	16.22		87	12.2	31.3	0.065	0.193	15.0	0.203	3.041	8.4	79.5
13:20	50	15.72		87	12.2	31.3	0.065	0.199	15.0	0.196	2.940	11.4	79.6
13:35	50	15.75		87	12.2	31.3	0.065	0.199	15.0	0.199	2.983	14.4	80
13:50	50	16.07	187	87	12.2	31.3	0.065	0.195	15.0	0.197	2.951	17.3	80.4
14:05	50	16.62	181	87	12.2	31.3	0.065	0.188	15.0	0.192	2.873	20.2	80.6
14:20	5	17.47	17	87	12.2	31.3	0.065	0.018	15.0	0.103	1.547	21.7	80.8
14:35	50	16.37	183	87	12.2	31.3	0.065	0.191	15.0	0.105	1.568	23.3	79.9
14:50	50	23.44	128	87	12.2	31.3	0.065	0.134	15.0	0.162	2.435	25.7	80.3
15:05	50	24.6	122	87	12.2	31.3	0.065	0.127	15.0	0.130	1.955	27.7	80.7
15:20	10	11.63	52	87	12.2	31.3	0.065	0.054	15.0	0.091	1.358	29.0	80.3
15:35	20	21.35	56	87	12.2	31.3	0.065	0.059	15.0	0.056	0.843	29.9	80.7
15:50		24.44		87	12.2	31.3	0.065	0.128	15.0	0.093	1.400	31.3	80.3
16:05	50	20.87	144	87	12.2	31.3	0.065	0.150	15.0	0.139	2.085	33.4	80.5
16:20	10	19.15		87	12.2	31.3	0.065	0.033	15.0	0.091	1.370	34.7	80.5
16:35	50	20.75		87	12.2	31.3	0.065	0.151	15.0	0.092	1.376	36.1	80.4
16:50	50	30.06	100	87	12.2	31.3	0.065	0.104	15.0	0.127	1.912	38.0	80.4
17:05		00.00		87	12.2	31.3	0.065	0.000	15.0	0.052	0.781	38.8	81
17:20				87	12.2	31.3		0.000	15.0	0.000	0.000	38.8	81
17:35		18.18	66	87	12.2	31.3		0.069	15.0	0.034	0.516		81
17:50		16.69		87	12.2		0.065	0.000	15.0	0.034	0.516	39.8	80.6
18:05		10.00		87	12.2	31.3	0.065	0.000	15.0	0.000	0.000	39.8	80.4
18:20	50	21.13	142	87	12.2	31.3	0.065	0.000	15.0	0.000	1,111	40.9	80.5
18:35	50	31.38		87	12.2	31.3	0.065	0.148	15.0	0.074	1.859	42.8	79.8
18:50		31.53		87	12.2	31.3	0.065	0.100	15.0	0.124	1.492	44.3	80.3
19:05	50	25.22		87	12.2	31.3		0.099	15.0	0.099	1.492	46.0	80.6
19:05		25.22	119	87	12.2	31.3	0.065	0.124	15.0	0.112	0.931	46.0	80.6
19:20	50	20.34	147	87	12.2	31.3	0.065	0.000	15.0	0.062	1.154	46.9	78.9
19:35	50	16.62	147	87	12.2	31.3	0.065	0.154	15.0			48.1 50.6	78.9
										0.171	2.566		
20:05	50	17.62	170	87	12.2	31.3	0.065	0.178	15.0	0.183	2.744	53.4	78.4
								0.106	481.0			51.2	79.9
	M	and DDM:				CC/MC	. Ita						
	the percents a							B. 60 A C					
Run Time	% O2	% CO2	% H2O	% CO	PPIMV ICE	PPMV PCE	PPMv TCA	MW					
12:05	95%	0%	5%	0%	5	5	5	31.3					

S Kujawa									
7/22/2003				Test Results					
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									
TEST RUN	MV-1								
	Results					Str RPM:	372		
	Product slurry Sp. Gr.:	1.13				Ou IVI IVI.			
	Final Product Slurry, ml:	129							
	Final Product Slurry, IIII.	123							
	Fig. 1 Dec doct Olympia and	146.1							
	Final Product Slurry, gm:								
	Dewar Flask net wt., gm	0.007							
	Liquid/slurry Product, gm:	146.1		(Slurry Wt, 100% H2O2/O2 RXN	): 291				
	Product Gas Weight, gm:	53.4							
	Product Wt, gm:	199.5							
	Total Charge Weight, gm:	291							
	Overall Mass Balance								
	Mass Balance Closure:	68.6%							
		]							
	Mass balance w/o gas:	89%							
	Species Mass Results			Species Mass Results					
	Species mass Results			Species Mass Results					
	TriChloroEthylene			HexachloroBenzene					
	Slurry analysis, 1, mg/kg:	2.00	1.1	пехаспоговениене					
	Slutty analysis, 1, mg/kg.	0.219							
	Slurry analysis, 2, mg/kg:			-1					
	Avg., mg/kg	1.110		slurry ,r	ng: tba				
	Total, mg:	0.162							
	TOE DDE W	00.000		LIOD DDE W	40.4411.15				
	TCE, DRE, %	99.98%		HCB, DRE, %	#VALUE!				
	Taba Oldara Ethadara			Di Disamid					
	TetraChloroEthylene	0.00		Bi-Phenyl					
	Slurry analysis, 1, mg/kg:	2.00							
	Slurry analysis, 2, mg/kg:	1.96	U						
	Avg., mg/kg			slurry ,r	ng: tbd				
	Total, mg:	0.289							
	PCE, DRE, %	99.6%		BP, DRE, %	#VALUE!		Run time:		Hours
							Run Temp		deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol.	0	mi
	Slurry analysis, 1, mg/kg:	2.00							
	Slurry analysis, 2, mg/kg:	1.96	U						
	Avg., mg/kg			slurry ,r	ng:				
	Total, mg:	0.289							
	TCA, DRE, %	99.7%		Aroclor, DRE, %	#VALUE!				
	DELID								
	BEHP								
	Slurry analysis, 1, mg/kg:					<u></u>			
	Slurry analysis, 2, mg/kg:			Semivolatile samples de	stroyed in ship	pping	1		
	Avg., mg/kg			<u> </u>					
	Total, mg:	#DIV/0!							
	BEHP, DRE, %	#DIV/0!							

S Kujawa			Heat Balance				
7/28/2003			Heat Balance				
TEST RUN	MV						
					numbers ir	red are qu	estionable
	Condenser Bath		Oil Bath				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
Time			Boss DS oil density, gm/ml	0.844			
			Boss DS oil heat cap. cal/gm/deg C	0.4			
note	Water Return Temp, Deg F	50	Oil Return Temp, Deg C	74.6			
	bucket ck volume. ml	1000	bucket ck volume. ml	100			
	Bucket ck time, sec	29.9	Bucket ck time, sec	8.63			
	Flow rate, ml/min	2007	Flow rate, ml/min	695			
	Enthalpy change, calorie/min:	10033	Enthalpy change, calorie/min:	-5962			
E	Flask Top Surface Temp., F	165	Flask bottom Surface Temp., F	169			
	Air Temp. ,F	87	Air Temp. ,F	87			
	Overall HT coef. Btu/hr/F/sq ft	0	Overall HT coef.	0			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	0	Convective Loss, cal/min	0			
	Radiative Loss, cal/min	557	Radiative Loss, cal/min	834			
	Flask top Heat Loss, cal/min	557	Flask bottom Heat Loss, cal/min	834			
	Reactor Temperature, C	80	P1 Gas Temp. Deg C.	31			
	Peroxide Temperature, F	70	Gas Flow Rate, gm/min	0.106			
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0031			
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	1.73			
	Peroxide Enthalpy Change, cal/m	0.0					
			Accumulation/Generation, cal/min	-5464			
	0/0/0000						
	8/8/2003: All heat transfer calculations are to	be considered	incorrect due to uncertainty of the				
	condenser water flow rates during						

S Kujawa								
8/6/2003			Reacto	r Charge				
0/0/2003				· <b>y</b> -				
TEST RUN	F-6							
		SURROGATE		Target			Actual	
Component		CONTROCTE	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
	Charge:		150			- Ciumb		
	Orlarge.		130					
water			120.0442	120.04		120.371		
hydraulic oil			2.0938	2.38		2.059		
cutting oil			2.0938	2.38		2.134		
cutting on			2.0930	2.30		2.104		
Al2O3	<del></del>		0.3349	0.08	83.9	0.3353		
CaO			0.5413	0.08	163.0	0.5409		
Cr2O3			0.2326	0.10	44.6	0.2333		
Fe2O3			1.3032	0.44	435.1	1,3031		
MgO			0.7269	0.38	375.9	0.7271		
MnO			0.4254	0.08	82.1	0.4251		
SiO2			8.3907	3.71	3712.7	8.3911		
Na3PO4			12.2584	4.83	4831.8	12.2578		
KOH			0.3224	0.16	157.8	0.3223		
Hg			0.0516	0.00	3.8	0.0715		
пу			0.0310	0.00	3.0	0.07 13		
Aroclor-1260						none		
A100101-1200						lione		
TCE			0.8431	0.58	577.5	0.8570	TCE	
PCE			0.0747	0.05	45.8	0.0804	PCE	
TCA			0.0941	0.07	70.2	0.0954	TCA	
BEHP			0.0941	0.07	165.2	0.1690	BEHP	170
DETIL	Total:		150.0	135.55	103.2	150.4	DEFIF	170
	TOtal.		130.0	133.33		130.4		
		REAGENTS						
Component		REAGENTO	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Component			Olaliis	Willingers	WIICIO E	Olaliis	William Cer 3	IIIICIO L
HCB			0.0056			0.0064	HCB	
BP			0.0029			0.0031	BP	
ы			0.0029			0.0001	DF	
FeSO4 7H2O			1.5			1.5005		
1 6304 /1120			1.3			1.5005		
H2O2 (50%)			600	500		600	500	
1.202 (00.70)			000	300		000	300	
H2SO4 (con)						11.6605		
112007 (0011)						11.5005		
NaOH (4 M)						3.457		
						3.707		
	Total:		751.5			767.0		
	, otal.		731.3			,07.0		

	S Kujawa 8/6/2003													
	TEST RUN	F-6												
Run Time	Gas Vol, cc	Time, sec	accm	Temp, C	P baro psia	MW	Density lb/ft^3	gm/min 0		Rate avg gm/min	Mass delta gm	Mass sum gm		Rctr T Deg C
9:45			0		12.04	31.4	0.067	0.000		0.000	0.000	0.0		43.
9:50 10:00			0		12.04 12.04	31.4 31.5	0.067 0.067	0.000	5.0 10.0	0.000	0.000			43. 43.
10:00		12.22	15	22	12.04	31.5	0.067	0.016	15.0	0.008	0.118			43.
10:30	3	10.43	17	23.5	12.04	31.5	0.066	0.018	15.0	0.017	0.255	0.4		44.
10:45			8	24	12.04	31.5	0.066	0.008	15.0	0.013	0.198			44.
11:00 11:15			16 19		12.04 12.04	31.6 31.6	0.066 0.066	0.016 0.020	15.0 15.0	0.012 0.018	0.184 0.275			44. 44.
11:30		30.34	20	25	12.04	31.6	0.066	0.020	15.0	0.010	0.273			44.
11:45	10	28.53	21	25	12.04	31.6	0.066	0.022	15.0	0.022	0.324	1.7		4:
12:00			21	26	12.04	31.6	0.066	0.022	15.0	0.022	0.332			44.
12:15 12:30			21 22	26 26	12.04 12.04	31.5 31.6	0.066 0.066	0.023 0.023	15.0 15.0	0.022 0.023	0.335 0.346			44.0
12:45		26.69	22	26	12.04	31.6	0.066	0.023	15.0	0.023	0.354			44.
13:00	10	26.68	22	25	12.04	31.5	0.066	0.024	15.0	0.024	0.357	3.4		44.
13:15			20	25	12.04	31.5	0.066	0.021	15.0	0.022	0.335			44.:
13:30 13:45			24 24	25 25	12.04 12.04	31.4 31.4	0.066 0.066	0.026 0.025	15.0 15.0	0.023 0.025	0.350 0.381	4.1 4.5		44.4
14:00		26.09	23	25	12.04	31.4	0.066	0.023	15.0	0.025	0.370			44.
14:15	10	25.19	24	25	12.04	31.4	0.066	0.025	15.0	0.025	0.370	5.2		45.
14:30			25	26	12.04	31.4	0.066	0.027	15.0	0.026	0.388			45.0
14:45 15:00			25 26	27 27	12.04 12.04	31.5 31.4	0.065 0.065	0.027 0.028	15.0 15.0	0.027 0.027	0.399 0.407			45.
15:15		23.59	25	27	12.04	31.4	0.065	0.027	15.0	0.027	0.408			46.3
15:30		23.37	26	27	12.04	31.4	0.065	0.027	15.0	0.027	0.401	7.2		46.3
15:45		22.75	26	27	12.04	31.4	0.065	0.028	15.0	0.027	0.409			46.2
16:00 16:15			26 26	27 27	12.04 12.04	31.4 31.4	0.065 0.065	0.027 0.027	15.0 15.0	0.027 0.027	0.410 0.408			46.4
16:30		24.12	25	28	12.04	31.4	0.065	0.026	15.0	0.027	0.400			46
16:45		23.81	25	28	12.04	31.4	0.065	0.026	15.0	0.026	0.392			46
17:00			25	26	12.04	31.4	0.066	0.026	15.0	0.026	0.390			46.1
17:15 17:30			26 20	26 25	12.04 12.04	31.4 31.4	0.066 0.066	0.027 0.021	15.0 15.0	0.026 0.024	0.395 0.361			46.4
17:45		27.35	22	25	12.04	31.4	0.066	0.023	15.0	0.022	0.333			46.4
							Avg's:	0.021	480.0			10.2	Avg:	45.1
Run Time		% CO2	% H2O	% CO	PPMv TCE	PPMv PCE	PPMv TCA	MW						
9:45		0.075%	4%	0.0010	2.6	2.0	1.2	31.4						
9:50 10:00		0.075% 0.189%	4% 4%	0.0021 0.0031	2.6 39.05	2.0	1.2 258.1	31.4 31.5						
10:15		0.303%	4%	0.0041	75.5	2.0	515.0							
10:30		0.166%	4%	0.0040	152	2	216	31.5						
10:45		0.332%	4%	0.0039	305	4	431	31.5						
11:00 11:15		0.498% 0.362%	4% 4%	0.0038 0.0036	457 <b>534</b>	5.5	647 <b>347.0</b>	31.6 31.6						
11:30		0.326%	4%	0.0035	601.5	4.85	327	31.6						
11:45	95.2%	0.290%	4%	0.0034	669	4.2	307.0	31.6						
12:00		0.268%	4%	0.0033	635	3.1	289	31.6						
12:15 12:30		0.247% 0.266%	4% 4%	0.0032 0.0031	<b>601</b> 768.5	2.0 10.35	<b>271.0</b> 324	31.5 31.6						-
12:45		0.285%	4%	0.0029	936	18.7	377.0	31.6						
13:00	95.3%	0.202%	4%	0.0028	603	28.4	220.6							
13:15		0.120% 0.099%	4% 4%	0.0027	270	38.1	64.2							
13:30			4%	0.0024	195	28.25	45.2	31.4						
				0.0021	120	18.4	/n /	.514						
13:45 14:00	95.5% 95.5%	<b>0.078%</b> 0.108%	4% 4%	0.0021 0.0018	<b>120</b> 135.5	<b>18.4</b> 18.45	<b>26.2</b> 28.15	31.4 31.4						
13:45 14:00 14:15	95.5% 95.5% 95.5%	0.078% 0.108% 0.139%	4% 4% 4%	0.0018 0.0014	135.5 <b>151</b>	18.45 <b>18.5</b>	28.15 <b>30.1</b>	31.4 31.4						
13:45 14:00 14:15 14:30	95.5% 95.5% 95.5% 95.5%	0.078% 0.108% 0.139% 0.139%	4% 4% 4% 4%	0.0018 0.0014 0.0011	135.5 <b>151</b> 151	18.45 <b>18.5</b> 18.5	28.15 <b>30.1</b> 30.1	31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45	95.5% 95.5% 95.5% 95.5% 95.5% 95.6%	0.078% 0.108% 0.139%	4% 4% 4%	0.0018 0.0014 0.0011 <b>0.0008</b>	135.5 <b>151</b> 151 <b>151</b>	18.45 18.5 18.5 18.5	28.15 <b>30.1</b>	31.4 31.4 31.4 31.5						
13:45 14:00 14:15 14:30	95.5% 95.5% 95.5% 95.5% 95.5% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139%	4% 4% 4% 4% 4%	0.0018 0.0014 0.0011	135.5 <b>151</b> 151	18.45 <b>18.5</b> 18.5	28.15 <b>30.1</b> 30.1 <b>30.1</b>	31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.102%	4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 <b>0.0008</b> 0.0007 0.0006 0.0006	135.5 151 151 151 112.25 73.5 69.5	18.45 18.5 18.5 18.5 15.55 12.6 12.4	28.15 30.1 30.1 30.1 21.2 12.3 12.05	31.4 31.4 31.5 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.102% 0.113%	4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 <b>0.0008</b> 0.0007 0.0006 0.0006	135.5 151 151 151 112.25 73.5 69.5 65.5	18.45 18.5 18.5 18.5 15.55 12.6 12.4	28.15 30.1 30.1 30.1 21.2 12.3 12.05	31.4 31.4 31.5 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30 15:45	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.102% 0.113% 0.130%	4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0007 0.0006 0.0006 0.0005	135.5 151 151 151 112.25 73.5 69.5 65.5 50.9	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30	95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.102% 0.113%	4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 <b>0.0008</b> 0.0007 0.0006 0.0006	135.5 151 151 151 112.25 73.5 69.5 65.5	18.45 18.5 18.5 18.5 15.55 12.6 12.4	28.15 30.1 30.1 30.1 21.2 12.3 12.05	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30 15:45 16:00 16:15	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.102% 0.113% 0.130% 0.147% 0.129% 0.111%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0007 0.0006 0.0006 0.0005 0.0004 0.0003 0.0003	135.5 151 151 112.25 73.5 69.5 65.5 50.9 36.3 32.2 28.1	18.45 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3	28.15 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:35 14:45 15:00 15:15 15:30 15:45 16:30 16:15 16:30	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.102% 0.102% 0.113% 0.130% 0.147% 0.129% 0.111% 0.125%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0006 0.0005 0.0004 0.0003 0.0003 0.0003	135.5 151 151 151 112.25 73.5 69.5 69.5 50.9 36.3 32.2 28.1 25.3	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3 6.8	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6 4.5	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30 16:45 16:30 16:45 17:00	95.5% 95.5% 95.5% 95.5% 6 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.114% 0.090% 0.113% 0.130% 0.147% 0.129% 0.111% 0.125% 0.139%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0006 0.0006 0.0005 0.0004 0.0003 0.0003 0.0002 0.0002	135.5 151 151 151 112.25 73.5 69.5 65.5 50.9 36.3 32.2 28.1 25.3 22.5	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3 6.8 6.6	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6 4.5 4.1 3.7	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:35 14:45 15:00 15:15 15:30 15:45 16:30 16:15 16:30	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.102% 0.102% 0.113% 0.130% 0.147% 0.129% 0.111% 0.125%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0006 0.0005 0.0004 0.0003 0.0003 0.0003	135.5 151 151 151 112.25 73.5 69.5 69.5 50.9 36.3 32.2 28.1 25.3	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3 6.8	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6 4.5	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30 16:45 16:00 16:15 16:30 17:15 17:30	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.108% 0.102% 0.102% 0.113% 0.130% 0.147% 0.129% 0.111% 0.125% 0.139%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0006 0.0006 0.0006 0.0003 0.0003 0.0002 0.0002	135.5 151 151 151 112.25 73.5 69.5 65.5 50.9 36.3 32.2 28.1 25.3 22.5 19.6	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3 6.8 6.6	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6 4.5 4.1 3.7 2.85	31.4 31.4 31.5 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						
13:45 14:00 14:15 14:30 14:45 15:00 15:15 15:30 16:45 16:00 16:15 16:30 17:15 17:30	95.5% 95.5% 95.5% 95.5% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6% 95.6%	0.078% 0.108% 0.139% 0.139% 0.139% 0.1080% 0.102% 0.102% 0.113% 0.130% 0.147% 0.129% 0.111% 0.125% 0.139%	4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4% 4%	0.0018 0.0014 0.0011 0.0008 0.0006 0.0006 0.0006 0.0003 0.0003 0.0002 0.0002	135.5 151 151 151 112.25 73.5 69.5 65.5 50.9 36.3 32.2 28.1 25.3 22.5 19.6	18.45 18.5 18.5 18.5 15.55 12.6 12.4 12.2 10 7.8 7.3 6.8 6.6	28.15 30.1 30.1 30.1 21.2 12.3 12.05 11.8 9.25 6.7 5.6 4.5 4.1 3.7 2.85	31.4 31.4 31.5 31.4 31.4 31.4 31.4 31.4 31.4 31.4 31.4						

	S Kujawa													
	8/6/2003				Gas P	hase Species I	Mass							
						· ·								
	TEST RUN	F-6												
	Instantaneous	s rates:						Integrated	quantities:					
	O2, gm/min	CO2, g/m	H2O g/m	CO g/m	TCE g/m	PCE g/m	TCA g/m	O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
				_		_					_			
ın Time														
9:45	0.0000	0.00E+00		0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	
9:50	0.0000	0.00E+00		0	0.00E+00	0.00E+00	0.00E+00			0.000	0.000	0.0E+00	0.0E+00	0.0E+0
10:00	0.0000	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00			0.000	0.000	0.0E+00	0.0E+00	0.0E+0
10:15	0.0152	6.64E-05		5.73E-05	4.94E-06	1.66E-07	3.42E-05			0.003	0.000	3.70E-05	1.24E-06	2.56E-0
10:30	0.0177	4.25E-05		6.49E-05	1.16E-05	1.81E-07	1.67E-05		0.001	0.009	0.001	1.61E-04	3.84E-06	6.38E-0
10:45	0.0078	3.75E-05		2.78E-05	1.02E-05	1.60E-07	1.47E-05		0.002	0.014	0.002	3.25E-04	6.40E-06	8.73E-0
11:00	0.0159	1.14E-04		5.48E-05	3.13E-05	4.87E-07	4.49E-05			0.018	0.003	6.36E-04	1.13E-05	1.32E-0
11:15	0.0194	1.02E-04		6.49E-05	4.46E-05	5.83E-07	2.94E-05		0.005	0.025	0.004	1.21E-03	1.93E-05	1.88E-0
11:30	0.0202	9.51E-05		6.53E-05	5.23E-05	5.34E-07	2.88E-05		0.006	0.032	0.005	1.93E-03	2.76E-05	2.31E-0
11:45	0.0215	8.99E-05		6.72E-05	6.18E-05	4.92E-07	2.88E-05		0.008	0.040	0.006	2.79E-03	3.53E-05	2.75E-0
12:00	0.0213	8.26E-05		6.43E-05	5.82E-05	3.60E-07	2.69E-05		0.009	0.048	0.007	3.69E-03	4.17E-05	3.16E-0
12:15	0.0218	7.79E-05		6.36E-05	5.64E-05	2.38E-07	2.58E-05			0.056	0.007	4.55E-03	4.62E-05	3.56E-0
12:30	0.0227	8.70E-05		6.35E-05	7.49E-05	1.28E-06	3.20E-05		0.011	0.064	0.008	5.53E-03	5.76E-05	3.99E-0
12:45	0.0229	9.41E-05		6.17E-05	9.21E-05	2.33E-06	3.77E-05		0.013	0.073	0.009	6.78E-03	8.47E-05	4.52E-0
13:00	0.0230	6.72E-05		5.95E-05	5.96E-05	3.56E-06	2.21E-05		0.014	0.081	0.010	7.92E-03	1.29E-04	4.97E-0
13:15	0.0202	3.50E-05		5.00E-05	2.34E-05	4.19E-06	5.65E-06		0.015	0.089	0.011	8.55E-03	1.87E-04	5.17E-0
13:30	0.0251	3.58E-05		5.48E-05	2.10E-05	3.85E-06	4.93E-06		0.015	0.098	0.012	8.88E-03	2.47E-04	5.25E-0
13:45	0.0243	2.74E-05		4.61E-05	1.25E-05	2.43E-06	2.78E-06		0.016	0.107	0.013	9.13E-03	2.94E-04	5.31E-0
14:00	0.0236	3.68E-05		3.78E-05	1.37E-05	2.36E-06	2.89E-06		0.016	0.116	0.013	9.33E-03	3.30E-04	5.35E-0
14:15	0.0244	4.87E-05		3.21E-05	1.58E-05	2.45E-06	3.20E-06		0.017	0.125	0.014	9.55E-03	3.66E-04	5.40E-0
14:30	0.0259		6.42E-04	2.65E-05	1.68E-05	2.60E-06	3.39E-06		0.017	0.134	0.014	9.79E-03	4.04E-04	5.45E-0
14:45	0.0258	5.14E-05		1.89E-05	1.67E-05	2.59E-06	3.38E-06		0.018	0.144	0.015	1.00E-02	4.43E-04	5.50E-0
15:00	0.0270	4.43E-05		1.77E-05	1.30E-05	2.28E-06	2.49E-06		0.019	0.154	0.015	1.03E-02	4.80E-04	5.54E-0
15:15	0.0259	3.35E-05		1.5E-05	8.16E-06	1.77E-06	1.39E-06			0.163	0.015	1.04E-02	5.10E-04	5.57E-0
15:30	0.0262	3.82E-05		1.32E-05	7.79E-06	1.76E-06	1.37E-06			0.173	0.015	1.05E-02	5.37E-04	5.59E-0
15:45	0.0269		6.66E-04	1.15E-05	7.54E-06	1.78E-06	1.38E-06			0.183	0.015	1.07E-02	5.63E-04	5.61E-0
16:00	0.0264	4.95E-05			5.75E-06	1.43E-06	1.06E-06		0.021	0.193	0.016	1.08E-02	5.87E-04	5.63E-0
16:15	0.0266	5.64E-05			4.14E-06	1.13E-06	7.75E-07	8.165	0.022	0.203	0.016	1.08E-02	6.06E-04	5.65E-0
16:30	0.0253	4.71E-05		5.79E-06	3.49E-06	1.00E-06	6.16E-07	8.554	0.023	0.212	0.016	1.09E-02	6.22E-04	5.66E-0
16:45	0.0256	4.09E-05		4.69E-06	3.08E-06	9.45E-07	5.01E-07	8.936		0.222	0.016	1.09E-02	6.37E-04	5.66E-0
17:00	0.0251	4.51E-05		3.44E-06	2.72E-06	8.98E-07	4.47E-07		0.024	0.231	0.016	1.10E-02	6.51E-04	5.67E-0
17:15	0.0262	5.23E-05		2.39E-06	2.52E-06	9.08E-07	4.21E-07	9.701		0.241	0.016	1.10E-02	6.64E-04	5.68E-0
17:30	0.0208	3.32E-05	5.14E-04	9.5E-07	1.74E-06	6.65E-07	2.57E-07	10.053	0.026	0.249	0.016	0.0111	0.0007	0.005
									l					
								Sum of cor	mponents=	10.36				
										100	1006-1	4.0000	0.0777	e
										VOC in gas/	VUC fed	1.29%	0.84%	5.96%

Kujawa									
8/6/20	003			Test Results	Str RPM:	456	Start		
EST RUN	F-6								
	Results								
	Product slurry Sp. Gr.:	1.17							
	Final Product Slurry, ml:	632							
	I mai Froduct Sidiry, mi.	002							
	E: 15 1 10	700.0							
	Final Product Slurry, gm:	738.6							
	Dewar Flask net wt., gm	0.0287							
	Liquid/slurry Product, gm:	738.6		(Slurry Wt, 100% H2O2/O2 RXN)	626				
	Product Gas Weight, gm:	10.7							
	Product Wt, gm:	749.3							
	r roudet vvt, gm.	745.5							
	T-4-1 Ob 10(-:b4	767							
	Total Charge Weight, gm:	/6/							
	Overall Mass Balance								
	Mass Balance Closure:	97.7%							
	Mass balance w/o gas:	96%							
			Ì						
	Species Mass Results			Species Mass Results					
	openes mass results			opecies mass results					
	T-:011		A 1 1 -	Harris III and Danier and		A 1 1 -			
	TriChloroEthylene		Anai. code	HexachloroBenzene		Anal. code			
	Slurry analysis, 1, mg/kg:	11.600		Slurry analysis, 1, mg/kg	: 17.800				
	Slurry analysis, 2, mg/kg:	12.400		Slurry analysis, 2, mg/kg		J			
	Avg., mg/kg	12.000		Avg., mg/kg	24.950				
	Total, mg:	8.863		Total, mg:	18.428				
				. 3					
	TCE, DRE, %	98.97%		HCB, DRE, %	-187.94%				
	102, 5112, 70	00.01.10		1100, 0112, 70	7				
	TetraChloroEthylene			Bi-Phenyl					
		0.000			0.000				
	Slurry analysis, 1, mg/kg:	8.820		Slurry analysis, 1, mg/kg					
	Slurry analysis, 2, mg/kg:	9.290		Slurry analysis, 2, mg/kg		J			
	Avg., mg/kg	9.055		Avg., mg/kg	8.660				
	Total, mg:	6.688		Total, mg:	6.396				
	· ·			-					
	PCE, DRE, %	91.68%		BP, DRE, %	-106.33%		Run time:	A	Hours
	, , , , , , , , , , , , , , , , , , , ,				1		Run Temp		deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol:		ml
		0.004			0.000		mzwz voi.	500	1111
	Slurry analysis, 1, mg/kg:	0.321		Slurry analysis, 1, mg/kg	0.000				
	Slurry analysis, 2, mg/kg:	0.400	J	Slurry analysis, 2, mg/kg					
	Avg., mg/kg	0.361		Avg., mg/kg					
	Total, mg:	0.266		Total, mg:	0.000				
	TCA, DRE, %	99.72%		Aroclor, DRE, %	#VALUE!				
	<u> </u>								
	BEHP								
	Slurry analysis, 1, mg/kg:	626.000	F						
	Slurny analysis 2 marks:	931.000							
	Slurry analysis, 2, mg/kg:		<u></u>		1				-
	Avg., mg/kg	778.500		Note: F6 semivolatile	7				
	Total, mg:	575.000		samples leaked in-transit.					
				Results questionable.					
	BEHP, DRE, %	-240.24%		Final mass of semivolatiles					
				exceeded charge to reactor					
				-	7				
					+				
3/2003:			-		1				-
V ZUU.31	1					l			
	calculations are to be considered incor								

S Kujawa								
8/7/2003			Heat Balance					
EST RUN	F-6				numbers in	red are qu	estionable.	
	On adams and Dotte		Oil D-4h					
	Condenser Bath		Oil Bath					
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	50				
	est t sint temperature, Beg e		Set Form Ferniperature, Bog C					
Time			Boss DS oil density, gm/ml	0.895				
			Boss DS oil heat cap. cal/gm/deg (	0.4				
10:20	Water Return Temp, Deg C	8	Oil Return Temp, Deg C	42.1				
	bucket ck volume, ml	1000	bucket ck volume, ml	100				
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.41				
	Flow rate, ml/min	2007 6020	Flow rate, ml/min	416 -1178				
	Enthalpy change, calorie/min:	6020	Enthalpy change, calorie/min:	-1170				
	Flask Top Surface Temp., C	35.7	Flask bottom Surface Temp., C	40.5				
	Flask Top Surface Temp., F	96	Flask bottom Surface Temp., F	105				
	Air Temp. ,F	71.6	Air Temp. ,F	71.6				
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3				
	Top flask Area, in^2	188	bottom flask Area, in^2	265				
	emisivity	0.94	emisivity	0.94				
	Convective Loss, cal/min	406	Convective Loss, cal/min	772				
	Radiative Loss, cal/min	140	Radiative Loss, cal/min	273				
	Flask top Heat Loss, cal/min	546	Flask bottom Heat Loss, cal/min	1046				
	Reactor Temperature, C	44	P1 Gas Temp. Deg C.	24				
	Peroxide Temperature, F	71.6	Gas Flow Rate, gm/min	0.008				
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0002				
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.13				
	Peroxide Enthalpy Change, cal/mir	42.2						
			Accumulation/Generation, cal/min	-6476				
11.10	Water Return Temp, Deg C	8.1	Oil Return Temp, Deg C	42.3				
11.10	bucket ck volume, ml	1000	bucket ck volume, ml	100				
	Bucket ck time, sec	29.9	Bucket ck volume, mi	14				
	Flow rate, ml/min		Flow rate, ml/min					
	Enthalpy change, calorie/min:	6221	Enthalpy change, calorie/min:	-1181				
	Entrialpy change, calonemin.	022,	Littlaipy change, calonemin.	1101				
	Flask Top Surface Temp., C	35.3	Flask bottom Surface Temp., C	41.3				
	Flask Top Surface Temp., F	96	Flask bottom Surface Temp., F	106				
	Air Temp. ,F	77	Air Temp. ,F	77				
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3				
	Top flask Area, in^2	188	bottom flask Area, in^2	265				
	emisivity	0.94	emisivity	0.94				
	Convective Loss, cal/min	305	Convective Loss, cal/min	680				
	Radiative Loss, cal/min	107	Radiative Loss, cal/min	245				
	Flask top Heat Loss, cal/min	412	Flask bottom Heat Loss, cal/min	926				
	Reactor Temperature, C	44.7	P1 Gas Temp. Deg C.	25.5				
	Peroxide Temperature, F	77	Gas Flow Rate, gm/min	0.022				
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0007				
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.36				
	Peroxide Enthalpy Change, cal/mir	37.8						
	<u> </u>		Accumulation/Generation, cal/min	-6415				
12:27	Water Return Temp. Deg C	8.4	Oil Return Temp, Deg C	42.2				
12.27	bucket ck volume, ml	1000	bucket ck volume, ml	100				
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.63				
	Flow rate, ml/min		Flow rate, ml/min					
	Enthalpy change, calorie/min:	6823	Enthalpy change, calorie/min:	-1145				
	Flask Top Surface Temp., C	32.5	Flask bottom Surface Temp., C	40.9				
	Flask Top Surface Temp., F	91	Flask bottom Surface Temp., F	106				
	Air Temp. ,F	78.8	Air Temp. ,F	78.8				
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3				
	Top flask Area, in^2	188	bottom flask Area, in^2	265				
	emisivity	0.94	emisivity	0.94				
	Convective Loss, cal/min	192	Convective Loss, cal/min	622				
	Radiative Loss, cal/min	67	Radiative Loss, cal/min	225				
	Flask top Heat Loss, cal/min	259	Flask bottom Heat Loss, cal/min	847				
	Reactor Temperature, C	44.6	P1 Gas Temp. Deg C.	27				
	Peroxide Temperature, F	78.8	Gas Flow Rate, gm/min	0.023				
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0007				
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.38				
	Peroxide Enthalpy Change, cal/mir	35.7						
Kujawa								
8/7/2003			Accumulation/Generation, cal/min	-6820				

8/7/2003						
ST RUN	F-6					
13:25	Water Return Temp, Deg C	7.5	Oil Return Temp, Deg C	40.9		
	bucket ck volume, ml	1000	bucket ck volume, ml	100		
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.28		
	Flow rate, ml/min	2007	Flow rate, ml/min			
	Enthalpy change, calorie/min:	5017	Enthalpy change, calorie/min:	-1369		
	Flask Top Surface Temp., C	30.5	Flask bottom Surface Temp., C	40.3		
	Flask Top Surface Temp., F	87	Flask bottom Surface Temp., F	105		
	Air Temp. ,F	76.1	Air Temp. ,F	76.1		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	178	Convective Loss, cal/min	659		
	Radiative Loss, cal/min	61	Radiative Loss, cal/min	236		
	Flask top Heat Loss, cal/min	238	Flask bottom Heat Loss, cal/min	896		
	Reactor Temperature, C	44.4	P1 Gas Temp. Deg C.	25		
	Peroxide Temperature, F	76.1	Gas Flow Rate, gm/min	0.023		
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0007		
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.38		
	Peroxide Enthalpy Change, cal/mir	38.2				
			Accumulation/Generation, cal/min	-4820		
14:35	Water Return Temp, Deg C	8.8	Oil Return Temp, Deg C	42.5		
	bucket ck volume, ml	1000	bucket ck volume, ml	100		
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.28		
	Flow rate, ml/min	2007	Flow rate, ml/min	420		
	Enthalpy change, calorie/min:	7625	Enthalpy change, calorie/min:	-1128		
			- · · · · · · · · · · · · · · · · · · ·			
	Flask Top Surface Temp., C	32.8	Flask bottom Surface Temp., C	41.3		
	Flask Top Surface Temp., F	91	Flask bottom Surface Temp., F	106		
	Air Temp. ,F	78.8	Air Temp. ,F	78.8		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	201	Convective Loss, cal/min	639		
	Radiative Loss, cal/min	70	Radiative Loss, cal/min	231		
	Flask top Heat Loss, cal/min	271	Flask bottom Heat Loss, cal/min	870		
	I lask top i leat Loss, califilli	2.7.1	I lask bottom rieat Loss, calimin	0,0		
	Reactor Temperature, C	45.6	P1 Gas Temp. Deg C.	27		
	Peroxide Temperature, F	78.8	Gas Flow Rate, gm/min	0.026		
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0008		
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.0000		
	Peroxide Enthalpy Change, cal/mir		F 1 loss, 1120 vapor, cal/min	0.42		
	Peroxide Enthalpy Change, califful	0.0				
			Accumulation/Generation, cal/min	-7639		
			Accumulation/Generation, cal/min	-/039	1	
			1			
15:10	Water Return Temp, Deg C	8.3	Oil Return Temp, Deg C	42.9		
10.10	I * * atol Notalli Follip, Deg O			100		
	bucketick volume imi	1000				1 1
	bucket ck volume, ml	1000	bucket ck volume, ml			
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.28		
	Bucket ck time, sec Flow rate, ml/min	29.9 2007	Bucket ck time, sec Flow rate, ml/min	<b>14.28</b> 420		
	Bucket ck time, sec	29.9	Bucket ck time, sec	14.28		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	29.9 2007 6622	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	<b>14.28</b> 420 -1068		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C	29.9 2007 6622 33.6	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C	14.28 420 -1068 41.7		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F	29.9 2007 6622 33.6 92	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F	14.28 420 -1068 41.7 107		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F	29.9 2007 6622 33.6 92 80.6	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp. ,F	14.28 420 -1068 41.7 107 80.6		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft	29.9 2007 6622 33.6 92 80.6	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef.	14.28 420 -1068 41.7 107 80.6		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	29.9 2007 6622 33.6 92 80.6 3 188	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2	14.28 420 -1068 41.7 107 80.6 3 265		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity	29.9 2007 6622 33.6 92 80.6 3 188 0.94	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity	14.28 420 -1068 41.7 107 80.6 3 265 0.94		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min.  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C.	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min  Reactor Temperature, C Peroxide Temperature, F	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264 46.2 80.6	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837 28 0.027		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264 46.2 80.6	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837 28 0.027 0.0008		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btw/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264 46.2 80.6 0	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837 28 0.027		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264 46.2 80.6 0	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837 28 0.027 0.0008		
	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btw/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	29.9 2007 6622 33.6 92 80.6 3 188 0.94 195 69 264 46.2 80.6 0	Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min	14.28 420 -1068 41.7 107 80.6 3 265 0.94 614 224 837 28 0.027 0.0008 0.45		

S Kujawa									
8/11/200	3			Reactor	Charge				
TEST RUN	F-13								
		SURROGA	TE		Target			Actual	
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
	Charge:			150					
water				120.0442	120.04		120.198		
hydraulic oil				2.0938	2.38		2.167		
cutting oil				2.0938	2.38		2.104		
Al2O3				0.3349	0.08	83.9	0.3350		
CaO				0.5413	0.16	163.0	0.5412		
Cr2O3				0.2326	0.04	44.6	0.2335		
Fe2O3				1.3032	0.44	435.1	1.3039		
MgO				0.7269	0.38	375.9	0.7275		
MnO				0.4254	0.08	82.1	0.4251		
SiO2				8.3907	3.71	3712.7	8.3909		
Na3PO4				12.2584	4.83	4831.8	12.2581		
KOH				0.3224	0.16	157.8	0.3217		
Hg				0.0516	0.00	3.8	0.0534		4
Aroclor-1260							none		
TCE				0.8431	0.58	577.5	0.8612		
PCE				0.0747	0.05	45.8	0.0754		
TCA				0.0941	0.07	70.2	0.0951		
BEHP				0.1619	0.17	165.2	0.1649		
	Total:			150.0	135.55		150.3		
		REAGENT:	S						
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
HCB				0.0056			0.0057		
BP				0.0029			0.0032		
FeSO4 7H2O				1.5			1.501		
H2O2 (50%)				480	400		480	400	
H2SO4 (con)							10.2456		
N. O									
NaOH (4 M)							4.619		
	+			22.5					
	Total:			631.5			646.6		

	S Kujawa				ı								
	8/11/2003												+
	5,11,2003												+
	TEST RUN	F-13											
Run Time	Gas Vol, cc	Time and		Temp, C	P baro	MW	Danaitu	er ma fera las	Time delte	Bata aug	Mass delta	Dana aum	Rctr T
tun mine	Gas voi, cc	Time, sec	accm	remp, C	psia	IVI VV	Density lb/ft^3	9117111111	Time delta min.	gm/min	gm	Mass sum	Deg C
					psia		ID/IC-3	0	111111.	gilliillii	giii	gm	Deg C
8:30 8:35	0		0	25 25	12.08 12.08	31.3 31.3	0.066 0.066	0.000	0.0 5.0	0.000	0.000	0.0	51 48
8:45	0		0	21	12.08	31.3	0.067	0.000	10.0	0.000	0.000	0.0	45
9:00	0	1	0	21	12.08	31.3	0.067	0.000	15.0	0.000	0.000	0.0	43
9:15	ő	1	0	21	12.08	31.3	0.067	0.000	15.0	0.000	0.000	0.0	43
9:30	0	1	0	21	12.08	31.3	0.067	0.000	15.0	0.000	0.000	0.0	4:
9:45	10	30.9	19	25	12.08	31.3	0.066	0.020	15.0	0.010	0.153	0.2	4:
10:00	10		18	25	12.08	31.3	0.066	0.019	15.0	0.020	0.293	0.4	4:
10:15	10	25.28	24	26	12.08	31.3	0.065	0.025	15.0	0.022	0.326	0.8	43
10:30	10	27.28	22	26	12.08	31.3	0.065	0.023	15.0	0.024	0.360	1.1	44
10:45	10	26.25	23	27	12.08	31.3	0.065	0.024	15.0	0.024	0.353	1.5	44
11:00			25	28	12.08	31.3	0.065	0.026	15.0		0.366	1.5	4.
11:15 11:30	10	23.16	26 26	29 29	12.08 12.08	31.3 31.3	0.065 0.065	0.027 0.027	15.0 15.0	0.026 0.027	0.396 0.406	1.9 2.3 End H2C	2 4:
11:30	10	23 23.31	26	29	12.08	31.3	0.065	0.027	15.0	0.027	0.406	2.3 End H2C	4:
12:00	10		30	30	12.08	31.3	0.065	0.027	15.0	0.027	0.404	3.1	40
12:15	10		28	30	12.08	31.3	0.065	0.030	15.0	0.029	0.454	3.6	47
12:30	10		27	30	12.08	31.3	0.065	0.028	15.0		0.432	4.0	47
12:45			29	30	12.08	31.3	0.065	0.030	15.0	0.029	0.433	4.5	4
13:00	10	21.47	28	30	12.08	31.3	0.065	0.029	15.0	0.029	0.440	4.9	4
13:15	10	22.03	27	31	12.08	31.3	0.065	0.028	15.0	0.029	0.428	5.3	4
13:30	10	20.94	29	31	12.08	31.3	0.064	0.030	15.0	0.029	0.433	5.8	4
13:45	10		28	31	12.08	31.3	0.064	0.029	15.0		0.439	6.2	4
14:00	10	22.3	27	31	12.1	31.3	0.065	0.028	15.0		0.426	6.6	4
14:15	10	23.62	25	29	12.1	31.3	0.065	0.026	15.0		0.408	7.0	4
14:30 14:45	10	23.81	25 24	27	12.1	31.3	0.065	0.026 0.026	15.0 15.0	0.026	0.397 0.390	7.4	46
15:00	10 10	24.59		27	12.1 12.06	31.3	0.065 0.066	0.026		0.026		7.8	46
15:00	10	26.9 27.12	22 22	23	12.06	31.3 31.3	0.066	0.024	15.0 15.0	0.025 0.024	0.369 0.353	8.2 8.5	4:
15:30			21	24	12.00	31.3	0.066	0.023	15.0		0.339	8.9	4:
15:45			21	23	12.02	31.3	0.066	0.022	15.0		0.331	9.2	4:
16:00	10	28.81	21	23	12.02	31.3	0.066	0.022	15.0		0.333	9.5	4:
16:15	10	30.97	19	24	12.02	31.3	0.066	0.020	15.0	0.021	0.318	9.9	
16:30	10	30.25	20	24	12.02	31.3	0.066	0.021	15.0	0.021	0.309	10.2	
16:45	10	30.47	20	24	12.02	31.3	0.066		15.0	0.021	0.312	10.5	4:
17:00	10	31.25	19	24	12.02	31.3	0.066	0.020	15.0	0.020	0.307	10.8	
17:15	10	33.52	18	23	12.02	31.3	0.066	0.019	15.0	0.020	0.293	11.1	44
17:30	10	31.53	19	25	12.02	31.3	0.065	0.020	15.0	0.019	0.291	11.4	44
17:45	10	30.56	20	25	12.02	31.3	0.065	0.021	15.0	0.020	0.304	11.7	
18:00	10		19	25	12.02	31.3	0.065	0.020	15.0	0.020	0.306	12.0	
18:15 18:30	10 10		20 19	25 25	12.02 12.02	31.3 31.3	0.065 0.065	0.021 0.020	15.0 15.0	0.021 0.021	0.308 0.308	12.3 12.6	4:
18:30	10		22	25	12.02	31.3	0.065	0.020	15.0		0.308	12.6	4:
19:00	10	28.68	21	25	12.02	31.3	0.065	0.023	15.0	0.021	0.321	13.3	4:
19:15	10	29.03	21	26	12.02	31.3	0.065	0.022	15.0	0.022	0.326	13.6	4:
19:30			21	26	12.02	31.3	0.065	0.022	15.0		0.329	13.9	4:
19:45	10	28.44	21	26	12.02	31.3	0.065	0.022	15.0	0.022	0.332	14.2	4:
20:00	10	30.32	20	26	12.02	31.3	0.065	0.021	15.0	0.021	0.320	14.6	4
20:15	10	28.72	21	26	12.02	31.3	0.065	0.022	15.0	0.021	0.319	14.9	4
20:30	10	29	21	26	12.02	31.3	0.065	0.022	15.0	0.022	0.326	15.2	4
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TEST RUN   F-13   F-1	
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12:00   95.5%   0.2664%   4%   0.0016%   8.8   9.2   2.1   31.4     12:15   95.5%   0.2759%   4%   0.0006%   24.9   11   3   31.5     12:20   95.5%   0.2854%   4%   0.0006%   41   12.8   3.9   31.5     12:45   95.5%   0.2882%   4%   0.0006%   33.05   10.6   3.45   31.5     13:00   95.5%   0.2909%   4%   0.0006%   25.1   8.4   3   31.5     13:15   95.5%   0.2844%   4%   0.0006%   25.05   9.25   2.85   31.5     13:30   95.5%   0.2844%   4%   0.0006%   25.05   9.25   2.85   31.5     13:34   95.5%   0.2730%   4%   0.0006%   25.05   9.25   2.4   31.4     14:00   95.5%   0.2616%   4%   0.0006%   11.7   8.4   2.1   31.4     14:15   95.5%   0.2661%   4%   0.0011%   14.7   8.9   2.1   31.4     14:30   95.5%   0.2730%   4%   0.0011%   17.7   9.4   2.1   31.5     15:10   95.5%   0.2736%   4%   0.0011%   17.7   9.4   2.1   31.4     15:15   95.5%   0.2766%   4%   0.0011%   13.55   8.65   2.1   31.4     15:16   95.5%   0.2766%   4%   0.0011%   13.55   8.65   2.1   31.4     15:16   95.5%   0.2766%   4%   0.0011%   8.8   8.35   2.1   31.4     15:16   95.5%   0.2800%   4%   0.0014%   8.8   8.35   2.1   31.4     16:00   95.5%   0.2747%   4%   0.0014%   8.9   8.15   2.1   31.4     16:15   95.5%   0.2766%   4%   0.0014%   7.05   6.75   2.1   31.4     16:45   95.5%   0.2766%   4%   0.0014%   4.5   6   2.1   31.4     16:45   95.5%   0.2766%   4%   0.0014%   4.5   6   2.1   31.4     16:45   95.5%   0.2838%   4%   0.0014%   4.5   6   2.1   31.4     17:16   95.5%   0.2703%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2703%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2703%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     17:16   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     17:17   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     17:18   95.5%   0.2663%   4%   0.0011%   4.5   6   2.1   31.4     1	
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13:15         95.5%         0.2877%         4%         0.0006%         25.05         9.25         2.85         31.5           13:30         95.5%         0.2844%         4%         0.0006%         25         10.1         2.7         31.5           13:45         95.5%         0.2730%         4%         0.0006%         18.35         9.25         2.4         31.4 recalibrate time?           14:00         95.5%         0.2616%         4%         0.0001%         11.7         8.4         2.1         31.4           14:15         95.5%         0.2616%         4%         0.0011%         14.7         8.9         2.1         31.4           14:15         95.5%         0.2705%         4%         0.0011%         17.7         9.4         2.1         31.4           14:45         95.5%         0.2736%         4%         0.0011%         13.55         8.65         2.1         31.4           15:10         95.5%         0.2783%         4%         0.0011%         9.4         7.9         2.1         31.4           15:15         95.5%         0.2783%         4%         0.0014%         8.2         8.8         2.1         31.4           15:30	
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14:15         95.5%         0.2661%         4%         0.0011%         14.7         8.9         2.1         31.4           14:30         95.5%         0.2705%         4%         0.0011%         17.7         9.4         2.1         31.5           14:45         96.5%         0.2736%         4%         0.0011%         13.55         8.65         2.1         31.4           15:00         95.5%         0.2766%         4%         0.0011%         9.4         7.9         2.1         31.4           15:15         95.5%         0.2783%         4%         0.0014%         8.8         8.35         2.1         31.4           15:15         95.5%         0.2783%         4%         0.0014%         8.2         8.8         2.1         31.4           15:45         95.5%         0.2806%         4%         0.0014%         8.2         8.8         2.1         31.4           16:00         95.5%         0.2694%         4%         0.0014%         8.9         8.15         2.1         31.4           16:15         95.5%         0.2684%         4%         0.0014%         7.05         6.75         2.1         31.4           16:30         95.5%	
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15:00         95.5%         0.2766%         4%         0.0011%         9.4         7.9         2.1         31.4           15:15         95.5%         0.2783%         4%         0.0014%         8.8         8.35         2.1         31.4           15:30         95.5%         0.2800%         4%         0.0014%         8.2         8.8         2.1         31.4           15:45         95.5%         0.2747%         4%         0.0014%         8.9         8.15         2.1         31.4           16:00         95.5%         0.2694%         4%         0.0014%         9.6         7.5         2.1         31.4           16:15         95.5%         0.2694%         4%         0.0014%         7.05         6.75         2.1         31.4           16:30         95.5%         0.2838%         4%         0.0014%         4.5         6         2.1         31.4           16:45         95.5%         0.2838%         4%         0.0011%         4.5         6         2.1         31.4           17:10         95.5%         0.2831%         4%         0.0011%         4.5         6         2.1         31.4           17:15         95.5% <td< td=""><td></td></td<>	
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15:45         95.5%         0.2747%         4%         0.0014%         8.9         8.15         2.1         31.4           16:00         95.5%         0.2694%         4%         0.0014%         9.6         7.5         2.1         31.4           16:15         95.5%         0.2766%         4%         0.0014%         7.05         6.75         2.1         31.4           16:30         95.5%         0.2838%         4%         0.0014%         4.5         6         2.1         31.4           16:45         95.5%         0.2845%         4%         0.0011%         4.5         6         2.1         31.4           17:00         95.5%         0.2851%         4%         0.0011%         4.5         6         2.1         31.4           17:15         95.5%         0.2777%         4%         0.0011%         4.5         6         2.1         31.4           17:30         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:0         95.5%         0.2663%	
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16:15         95.5%         0.2766%         4%         0.0014%         7.05         6.75         2.1         31.4           16:30         95.5%         0.2838%         4%         0.0014%         4.5         6         2.1         31.4           16:45         95.5%         0.2845%         4%         0.0011%         4.5         6         2.1         31.4           17:00         95.5%         0.2851%         4%         0.0011%         4.5         6         2.1         31.4           17:15         95.5%         0.2777%         4%         0.0011%         4.5         6         2.1         31.4           17:30         95.5%         0.2623%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5%         0.2639%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
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16:45         95.5%         0.2845%         4%         0.0011%         4.5         6         2.1         31.4           17:00         95.5%         0.2851%         4%         0.0011%         4.5         6         2.1         31.4           17:15         95.6%         0.277%         4%         0.0011%         4.5         6         2.1         31.4           17:30         95.5%         0.2703%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5%         0.2539%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
17:00         95.5%         0.2851%         4%         0.0011%         4.5         6         2.1         31.4           17:15         95.5%         0.2777%         4%         0.0011%         4.5         6         2.1         31.4           17:30         95.5%         0.2703%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5%         0.2539%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
17:15         95.5%         0.2777%         4%         0.0011%         4.5         6         2.1         31.4           17:30         95.5%         0.2703%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5%         0.2539%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
17:30         95.5%         0.2703%         4%         0.0011%         4.5         6         2.1         31.4           17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5%         0.2539%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
17:45         95.5%         0.2621%         4%         0.0011%         4.5         6         2.1         31.4           18:00         95.5% <b>0.2539</b> %         4%         0.0011% <b>4.5 6 2.1</b> 31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
18:00         95.5%         0.2539%         4%         0.0011%         4.5         6         2.1         31.4           18:15         95.5%         0.2663%         4%         0.0011%         5.1         6.3         2.1         31.4	
18:15 95.5% 0.2663% 4% 0.0011% 5.1 6.3 2.1 31.4	
18:30 95.5% <b>0.2787</b> % 4% 0.0011% <b>5.7 6.6 2.1</b> 31.4	
18:45         95.5%         0.2709%         4%         0.0011%         5.1         6.3         2.1         31.4	
19:00 95.5% <b>0.2631</b> % 4% 0.0011% <b>4.5 6 2.1</b> 31.4	
19:15 95.5% 0.2639% 4% 0.0011% 4.5 6 2.1 31.4	
19:30 95.5% <b>0.2646</b> % 4% 0.0011% <b>4.5 6 2.1</b> 31.4	
19:45 95.5% 0.2830% 4% 0.0011% 4.5 6 2.1 31.4	
20:00 95.5% <b>0.3013</b> % 4% 0.0011% <b>4.5 6 2.1</b> 31.4	
20:15 95.5% 0.2905% 4% 0.0011% 4.5 6 2.1 31.4	
20:30 95.5% 0.2796% 4% 0.0011% 4.5 6 2.1 31.4	

	S Kujawa			I										
	8/21/2003													
	0/21/2000													
	TEST RUN	F-13												
	Instantaneous i	ates:						Integrated	quantities:					
	O2, gm/min	CO2, g/m	H2O g/m	CO g/m	TCE g/m	PCE g/m	TCA g/m	O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
Run Time														
8:30		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00	0	0	0		0		
8:35		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00		0.000	0.000		0.000		
8:45		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00	0.000	0.000	0.000	0.000	0.000		
9:00		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00	0.000	0.000	0.000	0.000	0.000		0.00
9:15		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00	0.000	0.000	0.000	0.000	0.000		
9:30		0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.00E+00		0.000	0.000	0.000	0.000		
9:45		0.0001	0.0005	0.0000	6.66E-06	1.29E-06	1.70E-06		0.001	0.004		0.000		
10:00 10:15		0.0001 0.0001	0.0004 0.0006	0.0000	1.01E-05 8.80E-06	1.23E-06 1.51E-06	2.62E-06 2.06E-06	0.436 0.755	0.001 0.003	0.011 0.019	0.000	0.000 0.000		0.00
		0.0001	0.0006	0.0000			2.06E-06 5.69E-07	1.106	0.003	0.019	0.000	0.000		0.00
10:30 10:45		0.0001	0.0006	0.0000	3.75E-06 3.70E-06	1.27E-06 1.90E-06	5.59E-07 5.54E-07	1.106	0.004	0.027	0.000	0.000		
11:00		0.0001	0.0006	0.0000	3.79E-06	2.67E-06	5.54E-07 5.58E-07	1.451	0.008	0.036	0.000	0.000	0.000	0.00
11:15		0.0001	0.0007	0.0000	4.66E-06	2.29E-06	6.70E-07	2.201	0.007	0.045	0.000	0.001	0.000	
11:30		0.0001	0.0007	0.0000	5.39E-06	1.80E-06	7.62E-07	2.597	0.003	0.054	0.000	0.001	0.000	
11:45		0.0001	0.0007	0.0000	3.15E-06	1.54E-06	4.94E-07	2.992	0.011	0.004	0.000	0.001	0.000	
12:00		0.0001	0.0007	0.0000	1.14E-06	1.51E-06	2.77E-07	3.415	0.012	0.074	0.000	0.001	0.000	0.00
12:15		0.0001	0.0007	0.0000	3.08E-06	1.72E-06	3.76E-07	3.858	0.016	0.095		0.001	0.000	
12:30		0.0001	0.0007	0.0000	4.82E-06	1.90E-06	4.65E-07	4.280	0.017	0.106		0.001	0.000	
12:45		0.0001	0.0007	0.0000	4.11E-06	1.67E-06	4.36E-07	4.703	0.019	0.116		0.001	0.000	
13:00		0.0001	0.0007	0.0000	3.04E-06	1.29E-06	3.69E-07	5.133	0.021	0.127	0.000	0.001	0.000	0.00
13:15		0.0001	0.0007	0.0000	2.95E-06	1.38E-06	3.41E-07	5.551	0.023	0.137	0.000	0.001	0.000	0.00
13:30	0.0289	0.0001	0.0007	0.0000	3.10E-06	1.58E-06	3.39E-07	5.974	0.024	0.148	0.000	0.001	0.000	0.00
13:45	0.0283	0.0001	0.0007	0.0000	2.23E-06	1.42E-06	2.95E-07	6.403	0.026	0.158	0.000	0.001	0.000	0.00
14:00		0.0001	0.0007	0.0000	1.36E-06	1.24E-06	2.49E-07	6.819	0.028	0.168	0.000	0.001	0.000	0.00
14:15		0.0001	0.0006	0.0000	1.63E-06	1.25E-06	2.36E-07	7.218	0.029	0.178		0.001	0.000	
14:30		0.0001	0.0006	0.0000	1.96E-06	1.32E-06	2.36E-07	7.605	0.031	0.188	0.000	0.001	0.000	
14:45		0.0001	0.0006	0.0000	1.45E-06	1.17E-06	2.28E-07	7.986	0.032	0.197	0.000	0.001	0.000	
15:00		0.0001	0.0006	0.0000	9.29E-07	9.89E-07	2.11E-07	8.346	0.034	0.206	0.000	0.001	0.001	0.00
15:15		0.0001	0.0006	0.0000	8.63E-07	1.04E-06	2.09E-07	8.691	0.035	0.215		0.001	0.001	0.00
15:30		0.0001	0.0005	0.0000	7.46E-07	1.01E-06	1.94E-07	9.021	0.036	0.223	0.000	0.001	0.001	0.00
15:45		0.0001	0.0005	0.0000	8.33E-07	9.67E-07	2.00E-07	9.344	0.038	0.231	0.000	0.001	0.001	0.00
16:00		0.0001	0.0005	0.0000	8.83E-07	8.74E-07	1.96E-07	9.669	0.039	0.239	0.000	0.001	0.001	0.00
16:15		0.0001	0.0005	0.0000	6.01E-07	7.29E-07	1.82E-07	9.979	0.040	0.247	0.000	0.001	0.001	0.00
16:30		0.0001	0.0005	0.0000	3.93E-07	6.64E-07	1.86E-07	10.281 10.586	0.041 0.043	0.254 0.262	0.000	0.001 0.001	0.001	0.00
16:45 17:00		0.0001 0.0001	0.0005 0.0005	0.0000	3.90E-07 3.80E-07	6.59E-07 6.42E-07	1.85E-07 1.80E-07	10.585	0.043	0.262		0.001	0.001	0.00
17:00		0.0001	0.0005	0.0000	3.56E-07		1.69E-07	11.171	0.044	0.269		0.001	0.001	0.00
17:15		0.0001	0.0005	0.0000	3.76E-07	6.01E-07 6.36E-07	1.69E-07	11.171	0.045	0.276	0.000	0.001	0.001	0.00
17:30		0.0001	0.0005	0.0000	3.88E-07	6.56E-07	1.76E-07 1.84E-07	11.456	0.046	0.203	0.000	0.001	0.001	0.00
18:00		0.0001	0.0005	0.0000	3.81E-07	6.44E-07	1.84E-07	12.052	0.047	0.291		0.001	0.001	0.00
18:15		0.0001	0.0005	0.0000	4.44E-07	6.96E-07	1.86E-07	12.052	0.040	0.236		0.001	0.001	0.00
18:30		0.0001	0.0005	0.0000	4.84E-07	7.10E-07	1.81E-07	12.654	0.050	0.313	0.000	0.001	0.001	0.00
18:45		0.0001	0.0005	0.0000	4.81E-07	7.52E-07	2.01E-07	12.968	0.052	0.313	0.000	0.001	0.001	0.00
19:00		0.0001	0.0005	0.0000	4.13E-07	6.98E-07	1.96E-07	13.293	0.052	0.329		0.001	0.001	0.00
19:15		0.0001	0.0005	0.0000	4.07E-07	6.87E-07	1.93E-07	13.612	0.054	0.337	0.000	0.001	0.001	0.00
19:30		0.0001	0.0005	0.0000	4.19E-07	7.07E-07	1.98E-07	13.933	0.056	0.345		0.001	0.001	0.00
19:45		0.0001	0.0005	0.0000	4.15E-07	7.01E-07	1.97E-07	14.257	0.057	0.353	0.000	0.001	0.001	0.00
20:00		0.0001	0.0005	0.0000	3.89E-07	6.58E-07	1.84E-07	14.570	0.058	0.361	0.000	0.001	0.001	0.00
20:15		0.0001	0.0005	0.0000	4.11E-07	6.94E-07	1.95E-07	14.881	0.060	0.368	0.000	0.001	0.001	0.00
20:30		0.0001	0.0005	0.0000	4.07E-07	6.88E-07	1.93E-07	15.199	0.061	0.376	0.00017	0.0014		0.000
								O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
								Sum of cor	nponents=	15.64				
										VOC in gas	/ VOC fed	0.16%	0.99%	0.299

S Kujawa									
8/11/2003				Test Results	Str RPM:		Start		
0/11/2000					00 10 111		51611		
TEST RUN	F-13								
	Results								
	Product slurry Sp. Gr.:	1.15							
	Final Product Slurry, ml:	538							
	·								
	Final Product Slurry, gm:	619.3							
	Dewar Flask net wt., gm	0.0057							
	Liquid/slurry Product, gm:	619.3		(Slurry Wt, 100% H2O2/O2 RXN):	534				
	Product Gas Weight, gm:	15.2		Gas Results are "Somewhat" du	mmy numbers	pending a	nalyses		
	Product Wt, gm:	634.5							
	Total Charge Weight, gm:	647							
	Oursell Mana Balanca								
	Overall Mass Balance	00.40							
	Mass Balance Closure:	98.1%							
	Mass balance w/o gas:	96%							
	iviass balance w/o yas.	90%							
	Species Mass Results			Species Mass Results					
	Species mass results			Species mass results					
	TriChloroEthylene		Anal, code	HexachloroBenzene		Anal. code			
	Slurry analysis, 1, mg/kg:	0.819		Slurry analysis, 1, mg/	kg: 3.900				
	Slurry analysis, 2, mg/kg:	1.550		Slurry analysis, 2, mg/					
	Avg., mg/kg			Avg., mg					
	Total, mg:	0.734		Total, mg:	2.245				
				,					
	TCE, DRE, %	99.91%		HCB, DRE, %	60.61%				
	TetraChloroEthylene			Bi-Phenyl					
	Slurry analysis, 1, mg/kg:	4.870		Slurry analysis, 1, mg/					
	Slurry analysis, 2, mg/kg:	9.620		Slurry analysis, 2, mg/					
	Avg., mg/kg			Avg., mg					
	Total, mg:	4.487		Total, mg:	2.050				
	PCE, DRE, %	94.05%		BP, DRE, %	35,94%		Run time.		Hours
							Run Temp:		deg C
	1,1,1-TriChloroEthane			Arodor 1260			H2O2 vol:	400	mi
	Slurry analysis, 1, mg/kg:	1.940		Slurry analysis, 1, mg/					
	Slurry analysis, 2, mg/kg:	1.920		Slurry analysis, 2, mg/					
	Avg., mg/kg			Avg., mg					
	Total, mg:	1.195		Total, mg:	#DIV/0!				
	TCA, DRE, %	98.74%		Aroclor, DRE, %	#DIV/0!				
	TOA, DRE, 76	30.1470		Alodor, DRE, %	#51470!				
	BEHP				_				
	Slurry analysis, 1, mg/kg:	309	D						
	Slurry analysis, 1, mg/kg:	190							
	Avg., mg/kg								
	Total, mg:	155							
	•								
	BEHP, DRE, %	6.30%							
					-				
		Dogidos	l norovid - 4	est chaus approximately 250/ in the					
		residua	a peroxide t	est shows approximately 35% in th	aqueous iaye	1			
		<u> </u>					1	L	1

8/11/2003 ST RUN	F-13	F	leat Balance					
	Condenser Bath		Oil Bath					
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	50				
	out our remperature, page		out out temperature, buy o					
			at balance and heat generation calculations are v	/ery				
		uncerta	in ack of physical properties for the heating oil. Eff	orte are				
			nade to determine operating heat capacities and					
			Boss DS oil density, gm/ml	0.895				
			Boss DS oil heat cap. cal/gm/deg C	0.4				
9.38	Water Return Temp, Deg C	7.9	Oil Return Temp, Deg C	42.3				
0.00	bucket ck volume, ml	100	bucket ck volume, ml	100				
	Bucket ck time, sec Flow rate, ml/min	3.09 1942	Bucket ck time, sec Flow rate, ml/min	15.22 394				
	Enthalpy change, calorie/min:	5631	Enthalpy change, calorie/min:	-1087				
	Flask Top Surface Temp., C Flask Top Surface Temp., F	<b>35.4</b> 96	Flask bottom Surface Temp., C Flask bottom Surface Temp., F	38.8 102				
	Air Temp. ,F	77	Air Temp. ,F	77				
	Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	3 188	Overall HT coef. bottom flask Area, in^2	3 265				
	emisivity	0.94	emisivity	0.94				
	Convective Loss, cal/min	308	Convective Loss, cal/min	576				
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	108 416	Radiative Loss, cal/min Flask bottom Heat Loss, cal/min		1197			
	Plask top Heat Loss, califfili	410	Flask Dottom Heat Loss, cal/mili	701	1131			
	Reactor Temperature, C	43.7	P1 Gas Temp. Deg C.	25		O-malata di kanana anti di	100	
	Peroxide Temperature, F Peroxide Flow Rate, ml/min	77 <b>2</b>	Gas Flow Rate, gm/min Water Vap. gm/min	0.022 0.0102		Correlated losses, cal/min Reflux Gas Delta H. cal/min	1251	
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	5.68		Revised Acc/generation, cal/min	-201	_
	Peroxide Enthalpy Change, cal/mir	35.9						
			Accumulation/Generation, cal/min	-5783				
			Accompliation/Generation, cal/min	3/03				
	Correlated losses, cal/min	1251						
	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	1 -201						
	The vised 7 to 5/gerior action; equivilin	-						
10:32	Water Return Temp, Deg C	7.8	Oil Return Temp, Deg C	42.9				
10.02	bucket ck volume, ml	100	bucket ck volume, ml	100				
	Bucket ck time, sec	3.16	Bucket ck time, sec	15.25				
	Flow rate, ml/min Enthalpy change, calorie/min:	1899 5316	Flow rate, ml/min Enthalpy change, calorie/min:	393 -1000				
		0010						
	Flask Top Surface Temp., C	<b>34.7</b> 94	Flask bottom Surface Temp., C	40 104				
	Flask Top Surface Temp., F Air Temp. ,F	79	Flask bottom Surface Temp., F Air Temp. ,F	79				
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3				
	Top flask Area, in^2	188 0.94	bottom flask Area, in^2	265 0.94				
	emisivity Convective Loss, cal/min	254	emisivity Convective Loss, cal/min	580				
	Radiative Loss, cal/min	89	Radiative Loss, cal/min	209				
	Flask top Heat Loss, cal/min	344	Flask bottom Heat Loss, cal/min	789	1132			
	Reactor Temperature, C	44.3	P1 Gas Temp. Deg C.	27				
	Peroxide Temperature, F	79	Gas Flow Rate, gm/min	0.024		Correlated losses, cal/min	4440	
							1118	
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0007		Reflux Gas Delta H, cal/min	1	
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	2 0.8	Water Vap. gm/min P1 loss, H2O vapor, cal/min			Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min		
	Peroxide Flow Rate, ml/min	2 0.8	P1 loss, H2O vapor, cal/min	0.0007			1	
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	2 0.8		0.0007			1	
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir	2 0.8 34.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min	0.0007			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir Water Return Temp, Deg C	2 0.8 34.9 6.4	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C	0.0007			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml	2 0.8 34.9 6.4 1000	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml	0.0007 0.39 -5484 43.3 100			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	2 0.8 34.9 6.4 1000 29.16 2058	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/min	0.0007 0.39 -5484 43.3 100 14.91 402			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	2 0.8 34.9 6.4 1000 29.16	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	0.0007 0.39 -5484 43.3 100 14.91			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	2 0.8 34.9 6.4 1000 29.16 2058	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/min	0.0007 0.39 -5484 43.3 100 14.91 402			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F	2 0.8 34.9 6.4 1000 29.16 2058 2881 36.3	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F	2 0.8 34.9 6.4 1000 29.16 2058 2881 36.3 97 83	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F	2 0.8 34.9 6.4 1000 29.16 2058 2881 36.3	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	2 0.8 0.8 0.8 0.94 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	2 0.8 34.9 34.9 6.4 1000 29.16 25.8 2881 36.3 97 83 3.8 8.8 0.94 236 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, mi/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	2 0.8 0.8 0.8 0.94 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94	1008		1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp, IF Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	2 0.8 34.9 34.9 4.0 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1 5.1	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504 184			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C	2 0.8 34.9 6.4 1000 29.16 6058 2881 36.3 97 83 3 88 88 49 45.7 45.7	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C.	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504 184 667		Revised Acc/generation, cal/min	1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp, I,F Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	2 0.8 0.8 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504 184			1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Less, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min Peroxide Heat Cap, cal/gm/degC	2 0.8 0.8 34.9 6.4 1000 29.16 2058 2881 36.3 97 83 3 3 48.2 236 84 320 45.7 83 22 0.8	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504 184 187 87		Revised Acc/generation, cal/min	1	
11:35	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mir  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Blu/hr/F/sq ft Top flask Area, in^2 emishty Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min	2 0.8 0.8 34.9 6.4 1000 29.16 2058 2881 36.3 97 83 3 3 48.2 236 84 320 45.7 83 22 0.8	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask Dottom Rate, gm/min P1 Gas Flow Rate, gm/min Water Vap, gm/min	0.0007 0.39 -5484 43.3 100 14.91 402 -965 40.4 105 83 3 265 0.94 504 184 687 29.5 0.027		Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	952 1	

Kujawa			Heat Balance			
8/11/2003			пеас рагапсе			
EST RUN	F-13					
	Condenser Bath		Oil Bath			
	Condenser Batti		Oil Baut			
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	50		
Time			Boss DS oil density, gm/ml	0.895		
			Boss DS oil heat cap. cal/gm/deg C	0.4		
12:35	Water Return Temp, Deg C	6.5 1000	Oil Return Temp, Deg C	43.8		
	bucket ck volume, ml Bucket ck time, sec	28.25	bucket ck volume, ml Bucket ck time, sec	100 15.7		
	Flow rate, ml/min		Flow rate, ml/min			
	Enthalpy change, calorie/min:	3186	Enthalpy change, calorie/min:	-848		
	Ziniapy diange, existed		Zimapy mange, salenemini	1		
	Flask Top Surface Temp., C	36.7	Flask bottom Surface Temp., C	40.7		
	Flask Top Surface Temp., F	98	Flask bottom Surface Temp., F	105		
	Air Temp. ,F	86	Air Temp. ,F	86		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	198	Convective Loss, cal/min	447		
	Radiative Loss, cal/min	72	Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	165	881	
	Flask top Heat Loss, cal/min	270	riask bottom neat Loss, cai/min	611	001	
	Reactor Temperature, C	47.2	P1 Gas Temp. Deg C.	31		<del>                                     </del>
	Peroxide Temperature, F	86	Gas Flow Rate, gm/min	0.029	Correlated losses, cal/min	852
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0008	Reflux Gas Delta H, cal/min	1
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.47	Revised Acc/generation, cal/min	-5
	Peroxide Enthalpy Change, cal/mir					
			Accumulation/Generation, cal/min	-3219		
13:46	Water Return Temp, Deg C	6.5	Oil Return Temp, Deg C	43.9		
	bucket ck volume, ml Bucket ck time, sec	1000 28.87	bucket ck volume, ml Bucket ck time, sec	100 15.28		
	Flow rate, ml/min		Flow rate, ml/min			
	Enthalpy change, calorie/min:	3117	Enthalpy change, calorie/min:	-858		
	Entrapy change, calone/min.	3111	Entrialpy change, calone/min.	1 -636		
	Flask Top Surface Temp., C	37	Flask bottom Surface Temp., C	41		
	Flask Top Surface Temp., F	99	Flask bottom Surface Temp., F	106		
	Air Temp. ,F	88	Air Temp. ,F	88		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	174	Convective Loss, cal/min	413		
	Radiative Loss, cal/min	63	Radiative Loss, cal/min	153	804	
	Flask top Heat Loss, cal/min	238	Flask bottom Heat Loss, cal/min	566	004	
	Reactor Temperature, C	47.5	P1 Gas Temp. Deg C.	32.5		
	Peroxide Temperature, F	88	Gas Flow Rate, gm/min	0.029	Correlated losses, cal/min	752
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0009	Reflux Gas Delta H, cal/min	1
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.48	Revised Acc/generation, cal/min	104
	Peroxide Enthalpy Change, cal/mir					
	.,,					
			Accumulation/Generation, cal/min	-3064		
			lau a .			
	Water Return Temp, Deg C	6.5	Oil Return Temp, Deg C	42.7		
	bucket ck volume, ml	1000	bucket ck volume, ml	100		
	Bucket ck time, sec Flow rate, ml/min	29.25 2051	Bucket ck time, sec Flow rate, ml/min	15.15 396		
	Enthalpy change, calorie/min:	3077	Enthalpy change, calorie/min:	-1035		
	Z.i.i.aip y change, calone/illin.	5511	Entitially change, calonemin.	,,,,,,		
	Flask Top Surface Temp., C	34.5	Flask bottom Surface Temp., C	40.5		
	Flask Top Surface Temp., F	94	Flask bottom Surface Temp., F	105		
	Air Temp. ,F	80.6	Air Temp. ,F	80.6		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	222	Convective Loss, cal/min	563		
	Radiative Loss, cal/min	78	Radiative Loss, cal/min	204	1009	
	Flask top Heat Loss, cal/min	300	Flask bottom Heat Loss, cal/min	768	1068	
	Reactor Temperature, C	46.8	P1 Gas Temp. Deg C.	28		-
	incaciór remperature, C	80.6	Gas Flow Rate, gm/min	0.026	Correlated losses, cal/min	1051
	Peroxide Temperature F				Constituted tosses, carrillin	1001
	Peroxide Temperature, F				Reflux Gas Delta H. cal/min	1
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0008	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	1 -17
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	0 0.8			Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	-17
	Peroxide Flow Rate, ml/min	0 0.8	Water Vap. gm/min	0.0008		

Kujawa			Heat Balance				
8/11/2003			пеат разапсе				
ST RUN	F-13						
	Condenser Bath		Oil Bath				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	50			
T:			Bass DC sil density swelfed	0.005			
Time			Boss DS oil density, gm/ml Boss DS oil heat cap. cal/gm/deg C	0.895 0.4			
			Boss D3 oil fleat cap: car/giff/deg C	0.4			
15:20	Water Return Temp, Deg C	7	Oil Return Temp, Deg C	40.6			
	bucket ck volume, ml	1000	bucket ck volume, ml	100			
	Bucket ck time, sec	29.37	Bucket ck time, sec	15.03			
	Flow rate, ml/min		Flow rate, ml/min	399			
	Enthalpy change, calorie/min:	4086	Enthalpy change, calorie/min:	-1343			
			FI 11 " 0 f F				
	Flask Top Surface Temp., C	32	Flask bottom Surface Temp., C Flask bottom Surface Temp., F	32			
	Flask Top Surface Temp., F Air Temp., F	32	Air Temp. ,F	0			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	526	Convective Loss, cal/min	742			
	Radiative Loss, cal/min	122	Radiative Loss, cal/min	172			
	Flask top Heat Loss, cal/min	648	Flask bottom Heat Loss, cal/min	914	1562		
			510 T 5				
	Reactor Temperature, C		P1 Gas Temp. Deg C.	23		Correlated losses, cal/min	1204
	Peroxide Temperature, F Peroxide Flow Rate, ml/min	0	Gas Flow Rate, gm/min Water Vap. gm/min	0.000		Correlated losses, cal/min Reflux Gas Delta H, cal/min	1384
	Peroxide Flow Rate, mi/min Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.00		Revised Acc/generation, cal/min	-40
	Peroxide Enthalpy Change, cal/mir		1 1 1000, 1120 Yapor, Cal/IIIII	]		, to today Acorgoniciation, cal/IIIII	7.9
	January Change, Samin						
			Accumulation/Generation, cal/min	-4305			
16:40	Water Return Temp, Deg C	6.5	Oil Return Temp, Deg C	42			
	bucket ck volume, ml	1000	bucket ck volume, ml	100			
	Bucket ck time, sec Flow rate, ml/min	28.82	Bucket ck time, sec	16.38			
		2082 3123	Flow rate, ml/min	366 -1049			
	Enthalpy change, calorie/min:	3123	Enthalpy change, calorie/min:	1 -1043			
	Flask Top Surface Temp., C		Flask bottom Surface Temp., C				
	Flask Top Surface Temp., F	32	Flask bottom Surface Temp., F	32			
	Air Temp. ,F		Air Temp. ,F	0			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	526 122	Convective Loss, cal/min	742			
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	648	Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	172 914	1562		
	Trask top freat Loss, cal/fillif	040	Hask bottom Heat Loss, cal/min	] 514	1302		
	Reactor Temperature, C		P1 Gas Temp. Deg C.	24			
	Peroxide Temperature, F	0	Gas Flow Rate, gm/min	0.019		Correlated losses, cal/min	1317
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0006		Reflux Gas Delta H, cal/min	1
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.31		Revised Acc/generation, cal/min	-269
	Peroxide Enthalpy Change, cal/mir	0.0					
			A	6 AA W			
			Accumulation/Generation, cal/min	-3636			
	I.						
17:35	Water Return Temp, Deg C	6.3	Oil Return Temp, Deg C	41.8			
00	bucket ck volume, ml	1000	bucket ck volume, ml	100			
	Bucket ck time, sec	28.34	Bucket ck time, sec	14.47			
	Flow rate, ml/min	2117	Flow rate, ml/min	415			
	Enthalpy change, calorie/min:	2752	Enthalpy change, calorie/min:	-1217			
	5 7 9 9 9	0	Florida de la Constancia de la Constanci				
	Flask Top Surface Temp., C	31.7	Flask bottom Surface Temp., C	39.6			
	Flask Top Surface Temp., F Air Temp., F	89 77	Flask bottom Surface Temp., F Air Temp., F	103 77			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	198	Convective Loss, cal/min	609			
-	Radiative Loss, cal/min	68	Radiative Loss, cal/min	218			
	Flask top Heat Loss, cal/min	267	Flask bottom Heat Loss, cal/min	827	1094		
	December Territoria	4.5	DI Con Tarre D				
	Reactor Temperature, C	44.8	P1 Gas Temp. Deg C.	25		Completed leases 15:-	4054
	Peroxide Temperature, F Peroxide Flow Rate, ml/min	77	Gas Flow Rate, gm/min	0.019 0.0006		Correlated losses, cal/min Reflux Gas Delta H, cal/min	1251
		ı UI	Water Vap. gm/min	0.0000			
				0.30		Revised Acc/generation cal/min	_2/
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.32		Revised Acc/generation, cal/min	-34
		0.8		0.32		Revised Acc/generation, cal/min	-34

S Kujawa								
	3/15/2003		Read	tor Charge				+
	7072000							
TEST RUN	F-20							
	. 20	SURROGATE		Target			Actual	
Component			Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
- Component	Charge:		150			- Crumo		
	onarge.		,,,,,					
water			120.0442	120.04		120.203		
hydraulic oil			2.0938	2.38		2.160		
cutting oil			2.0938	2.38		2.183		
AI2O3			0.3349	0.08	83.9	0.3349		
CaO			0.5413	0.16	163.0	0.5414		
Cr2O3			0.2326	0.04	44.6	0.2329		
Fe2O3			1.3032	0.44	435.1	1.3033		
MgO			0.7269	0.38	375.9	0.7271		
MnO			0.4254	0.08	82.1	0.4251		
SiO2			8.3907	3.71	3712.7	8.3915		
Na3PO4			12.2584	4.83	4831.8	12.2582		
кон			0.3224	0.16	157.8	0.3223		
Hg			0.0516	0.00	3.8	0.0519		4
Aroclor-1260						none		
TCE			0.8431	0.58	577.5	0.8546		
PCE			0.0747	0.05	45.8	0.0705		
TCA			0.0941	0.07	70.2	0.0920		
BEHP			0.1619	0.17	165.2	0.1666		
	Total:		150.0	135.55		150.3		
		REAGENTS						
Component			Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
HCB			0.0056			0.0060		
BP			0.0029			0.0029		
FeSO4 7H2O			1.5			1.5015		
H2O2 (50%)			180	150		180	150	)
H2SO4 (con)						13.1487		
, ,								
NaOH (4 M)						0.349		
` '								
	Total:		331.5			345.3		

	S Kujawa													
	8/15/2003													
	TEST RUN	F-20												
Run Time	Gas Vol. cc	Time, sec	accm	Temp, C	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum		Retr T
	,	,		.,	psia		lb/ft^3	0	min.	gm/min	gm	gm		Deg C
										_		,		
8:15	10	7.44	81	20.5	12.11	31.3	0.067	0.086		0.043	0.000	0.0		82.9
8:20	10	4.41	136	21	12.11	31.3	0.067	0.146		0.116	0.580			83
8:30	50	8.1	370	21.5	12.11	31.3	0.067	0.396	10.0	0.271	2.707	3.3		89.6
8:45		6.66	450	22	12.11	31.3	0.067	0.480		0.438	6.571			92.6
9:00	50	7.79	385	22.5	12.11	31.3	0.066	0.410	15.0	0.445	6.679			92
9:15	50	8.04	373	23	12.11	31.3	0.066	0.397	15.0	0.403	6.051	22.6		90.5
9:30	50	9.72	309	22.5	12.11	31.3	0.066	0.329	15.0	0.363	5.440			90.8
9:45		14.07	213	23	12.11	31.3	0.066	0.227	15.0	0.278	4.165			89.3
10:00	50	19.78	152	23	12.11	31.3	0.066	0.161	15.0	0.194	2.909			87.7
10:15		28.38	106	23	12.11	31.3	0.066	0.112	15.0	0.137	2.052			86.5
10:30	50	40.85	73	24	12.11	31.3	0.066	0.078		0.095	1.426			85.3
10:45		12.09	50	24.5	12.11	31.3	0.066	0.052		0.065	0.977	39.6		83.4
11:00	10	17.1	35	25.5	12.11	31.3	0.066	0.037	15.0	0.057	0.861	39.4		83.1
11:15		26.66	23	26	12.11	31.3	0.066	0.024	15.0	0.030	0.455			82.6
11:30	10	31.47	19	26	12.11	31.3	0.066	0.020	15.0	0.022	0.328			82.7
11:45	10 10	39.5 50.03	15	26	12.11 12.15	31.3	0.066	0.016		0.018	0.270			82.7
12:00		35.31	12 8	27 27	12.15	31.3 31.3	0.066	0.013	15.0 15.0	0.014	0.215 0.162			82.1 81.9
12:15	5	43.75	7	27	12.15	31.3	0.066	0.009	15.0	0.011				81.9
12:30 12:45	5	52.88	6	28	12.15	31.3	0.066 0.066	0.007	15.0	0.008	0.121 0.099	41.0 41.1		82.2 82.7
13:00	5	59.47	5	28	12.15	31.3	0.065	0.005	15.0	0.007	0.099			82.8
13:15		88.85	3	28	12.15	31.3	0.065	0.003	15.0	0.004	0.064			83.1
13:13	5	75.62	4	29	12.15	31.3	0.065	0.004	15.0	0.004	0.058			83.4
13:45		96.12	2	30	12.15	31.3	0.065	0.004		0.004	0.036			83.7
14:00	0	30. IZ	0	31	12.15	31.3	0.065	0.002	15.0	0.003	0.046			83.8
14:15	0	1	0	32	12.16	31.3	0.065	0.000	15.0	0.000	0.000			83.6
14:30		1	0	33	12.16	31.3	0.065	0.000		0.000	0.000			83.7
14:45		1	0	33	12.16	31.3	0.064	0.000	15.0	0.000	0.000			84.3
15:00	0	1	0	34	12.16	31.3	0.064	0.000		0.000	0.000			84
15:15		1	0	34	12.16	31.3	0.064	0.000	15.0	0.000	0.000			84.1
15:30	0	1	0	34	12.16	31.3	0.064	0.000		0.000	0.000			84.5
15:45		1	0	34	12.16	31.3	0.064	0.000		0.000	0.000			84.1
16:00	0	1	0	34	12.16	31.3	0.064	0.000	15.0	0.000	0.000			84.5
16:15		1	0	33	12.16	31.3	0.064	0.000	15.0	0.000	0.000			84.6
	-	i i				2	2.301			2.200	2.000	1		
							Avg's:	0.089	480.0			42.6	Avg:	84.9

S Kujawa											
3 Kujawa 8/15/	2002				Test Results	_	Str RPM:		Start		
6/13/	2003			— L	rest Results		Oli KPIVI.		Otali		
TEOT DUN	F-20			_							
TEST RUN											
	Results										
	Product slurry Sp. Gr.:	1.09									
	Final Product Slurry, ml:	271									
	Final Product Slurry, gm:	295.1									
	Dewar Flask net wt., gm	0.3507									
	Liquid/slurry Product, gm:	295.5		(Slurry V	Vt, 100% H2O	2/02 RXN):	303				
	Product Gas Weight, gm:	41.4									
	Product Wt, gm:	336.8									
	, 9										
	Total Charge Weight, gm:	345									
	Total Grange Weight, gill										
	Overall Mass Balance			1							
	Mass Balance Closure:	97.5%									
	mass Dalatice Closure.	51.370		+				-	l		
	Mana halanaa uu/a saas	86%									
	Mass balance w/o gas:	00%	-								
	On a class Manage Daniella					14 -					
	Species Mass Results			Sp	ecies Mass R	esuits					
	TriChloroEthylene				oroBenzene			Anal. code			
	Slurry analysis, 1, mg/kg:	17.100			Slurry analysis		5.470				
	Slurry analysis, 2, mg/kg:	20.200			Slurry analysis		5.780				
	Avg., mg/kg	18.650				wg., mg/kg					
	Total, mg:	5.504			Total, mg:		1.660				
	TCE, DRE, %	99.36%		HCB, DR	RE, %		72.33%				
	TetraChloroEthylene			Bi-Phen	VI						
	Slurry analysis, 1, mg/kg:	2.630			Slurry analysis	. 1. ma/ka:	4.730	U			
	Slurry analysis, 2, mg/kg:	3.290			Slurry analysis	. 2. mg/kg:	0.523	J			
	Avg., mg/kg	2.960				vg., mg/kg	2.627				
	Total, mg:	0.873			Total, mg:	wg., mgmg	0.775				
	Total, mg.	0.073			rotal, mg.		0.773				
	PCE, DRE, %	98.76%		BP, DR	- 04		73.27%		Run time:		8 Hours
	TOE, BRE, 70	1	ì	DI , DIXE	_, 70		15.2770		Run Temp:		84.9 deg C
	1,1,1-TriChloroEthane			Aroclor 1	1260				H2O2 vol:		150 ml
		0.268	-			1 mali:-:	thd		114W4 YU.		DO III
	Slurry analysis, 1, mg/kg:				Slurry analysis		เมน				
	Slurry analysis, 2, mg/kg:	0.305		-	Slurry analysis		#D0 (6)				-
	Avg., mg/kg	0.287				wg., mg/kg					
	Total, mg:	0.085		1	Total, mg:		#DIV/0!			$\longrightarrow$	
				l						$\longrightarrow$	
	TCA, DRE, %	99.91%	<u> </u>	Aroclor,	DRE, %		#DIV/0!				
	BEHP										
	Slurry analysis, 1, mg/kg:	190									
	Slurry analysis, 2, mg/kg:	195									
	Avg., mg/kg	193									
	Total, mg:	57									
				_					<del>                                     </del>	$\overline{}$	
	BEHP, DRE, %	65.90%									_

	8/15/2003		Heat	Balance					
EST RUN		F-20							
		Condenser Bath			Oil Bath				
		Cat Daint Tamparatura Dag C	5	Cat Da	nt Tampaceture Dec C	100			
		Set Point Temperature, Deg C	3	Set Pol	nt Temperature, Deg C	100			
			I he h uncer		at generation calculations	are very			
					operties for the heating oil	. Efforts are			
			being	made to determine	operating heat capacities	and			
				Ross D	S oil density, gm/ml	0.873			
					S oil heat cap. cal/gm/deg				
	8:38	Water Return Temp, Deg C bucket ck volume, ml	6.9 1000		urn Temp, Deg C ck volume, ml	78.6 100			
		Bucket ck time, sec	57.84		ck time, sec	9.72			
		Flow rate, ml/min			Flow rate, ml/min				
		Enthalpy change, calorie/min:	1971	Enthalp	y change, calorie/min:	-4613			
		Flask Top Surface Temp., C	71.6	Flask b	ottom Surface Temp., C	79.4			
		Flask Top Surface Temp., F	161	Flask b	ottom Surface Temp., F	175			
		Air Temp. ,F	70.7	Air Ten		70.7			
		Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	2.75 188		HT coef. flask Area, in^2	2.75 265			
		emisivity	0.94	emisivi		0.94			
		Convective Loss, cal/min	1360	Conve	ctive Loss, cal/min	2215			
		Radiative Loss, cal/min Flask top Heat Loss, cal/min	612 1972		ve Loss, cal/min ottom Heat Loss, cal/min	1035 3251	5222		
		i iaak top meat Loss, califfilli	1972	riask	ottom meat LOSS, Cal/MIN	   	5222		
		Reactor Temperature, C	89.6		Temp. Deg C.	23			
		Peroxide Temperature, F	70.7 2		ow Rate, gm/min Vap. gm/min	0.438			
		Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	0.8		vap. gm/min , H2O vapor, cal/min	0.0129 7.18			
		Peroxide Enthalpy Change, cal/m			,				
				Accum	ulation/Generation, cal/mir	-2718			
		Correlated losses, cal/min	4708						
		Reflux Gas Delta H, cal/min	752						
		Revised Acc/generation, cal/min	-978						
	9:33	Water Return Temp, Deg C	6.8 1000		urn Temp, Deg C	78.5 1000			
		bucket ck volume, ml Bucket ck time, sec	58.07		ck volume, ml ck time, sec	97.63			
		Flow rate, ml/min	1033		Flow rate, ml/min	615			
		Enthalpy change, calorie/min:	1860	Enthalp	y change, calorie/min:	-4614			
		Flask Top Surface Temp., C	75.2	Flask h	ottom Surface Temp., C	78.4			
		Flask Top Surface Temp., F	167		ottom Surface Temp., F	173			
		Air Temp. ,F	73	Air Ten	ıp. ,F	73			
		Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	2.75 188		HT coef. flask Area, in^2	2.75 265			
		emisivity	0.94	emisivi		0.94			
		Convective Loss, cal/min	1423		ctive Loss, cal/min	2128			
		Radiative Loss, cal/min	655		ve Loss, cal/min	995	5004		
		Flask top Heat Loss, cal/min	2078	Flask b	ottom Heat Loss, cal/min	3123	5201		
		Reactor Temperature, C	90.8	P1 Gas	Temp. Deg C.	24			
		Peroxide Temperature, F	73	Gas Fl	ow Rate, gm/min	0.363			
		Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	0.8		/ap. gm/min , H2O vapor, cal/min	0.0107 5.94			
		Peroxide Enthalpy Change, cal/mi		F 1 1055	, vapor, caminii	] [			
			1						
				Accum	ulation/Generation, cal/mir	n -2584			
		Correlated losses, cal/min	4641						
		Reflux Gas Delta H, cal/min	623						
		Revised Acc/generation, cal/min	-780						
	10:32	Water Return Temp, Deg C	6.9		urn Temp, Deg C	78			
		bucket ck volume, ml	1000		ck volume, ml	1000			
		Bucket ck time, sec Flow rate, ml/min	<b>58.06</b> 1033		ck time, sec Flow rate, ml/mir	93.93 639			
		Enthalpy change, calorie/min:	1963		y change, calorie/min:	-4907			
		Flask Top Surface Temp., C	67.5		ottom Surface Temp., C	<b>78.4</b> 173			
		Flask Top Surface Temp., F Air Temp. ,F	154 <b>75.2</b>		ottom Surface Temp., F	75.2			
		Overall HT coef. Btu/hr/F/sq ft	2.75	Overall	HT coef.	2.75			
		Top flask Area, in^2	188	bottom	flask Area, in^2	265			
		emisivity Convective Loss cal/min	0.94 1181			0.94			
		Convective Loss, cal/min Radiative Loss, cal/min	1181 526		ctive Loss, cal/min ve Loss, cal/min	2081 979			
		Flask top Heat Loss, cal/min	1707		ottom Heat Loss, cal/min	3060	4767		
		December Ten	-		- T D C				
		Reactor Temperature, C Peroxide Temperature, F	85.3 75.2		Temp. Deg C. ow Rate, gm/min	24.5 0.095		Correlated losses, cal/min	46
		Peroxide Flow Rate, ml/min	2	Water	Vap. gm/min	0.0028		Reflux Gas Delta H, cal/min	7
		Peroxide heat Cap, cal/gm/degC	0.8		, H2O ∨apor, cal/min	1.56		Revised Acc/generation, cal/min	
		Peroxide Enthalpy Change, cal/m	i 117.7						-
		t and the second	t .					1	

Kujawa 8/15/2003		Heat E	Balance		<del>                                     </del>			<del>                                     </del>
6/15/2003 EST RUN	F-20				<del>                                     </del>			
-ST KON	F-20							
	Condenser Bath			Oil Bath				
	CONTROLLED DATE							
	Set Point Temperature, Deg C	5	Set P	oint Temperature, Deg C	100			
	out to important of Dog C			ent remperature, page				
		The he	at balance and h	neat generation calculations	are very			
		uncerta			· •			
		due to I	ack of physical	properties for the heating oil.	Efforts are			
				ne operating heat capacities:				
			Boss	DS oil density, gm/ml	0.873			
				DS oil heat cap. cal/gm/deg	0.4			
11:32	Water Return Temp, Deg C	6.9	Oil Re	eturn Temp, Deg C	78.1			
	bucket ck volume, ml	1000		et ck volume, ml	1000			
	Bucket ck time, sec	57.4		et ck time, sec	93.94			
	Flow rate, ml/min	1045	Dudik	Flow rate, ml/min	639			
	Enthalpy change, calorie/min:	1986	Entha	lpy change, calorie/min:	-4884			
			Zitato					
	Flask Top Surface Temp., C	64.7	Flask	bottom Surface Temp., C	78.3			
	Flask Top Surface Temp., F	148		bottom Surface Temp., F	173			
	Air Temp. ,F	78.8		emp. ,F	78.8			
	Overall HT coef. Btu/hr/F/sq ft	2.75		all HT coef.	2.75			
	Top flask Area, in^2	188		n flask Area, in^2	265			
	emisivity	0.94	emisi		0.94			
	Convective Loss, cal/min	1050		ective Loss, cal/min	2001			
	Radiative Loss, cal/min	466		tive Loss, cal/min	949			
	Flask top Heat Loss, cal/min	1517		bottom Heat Loss, cal/min	2949	4466		
	Trask top freat 2003, canfillin	1317	I lask	bottom ricat 2033, calimin	2343	4400		
	Reactor Temperature, C	82.7	P1 G	as Temp. Deg C.	27			
	Peroxide Temperature, F	78.8	Gas	Flow Rate, gm/min	0.022			
	Peroxide Flow Rate, ml/min	2	Mate	r Vap. gm/min	0.0006			
	Peroxide heat Cap, cal/gm/degC	0.8		ss, H2O vapor, cal/min	0.0000			
	Peroxide Enthalpy Change, cal/mi	108.9	1 110	33, TIZO Vapor, Califfili	0.50			
	reroxide Entrialpy Change, califfil	100.5						
			Accur	mulation/Generation, cal/min	-1677			
			Accui	indiation/Scheration, cal/min	1024			
	Correlated losses, cal/min	4442						
	Reflux Gas Delta H, cal/min	38						
	Revised Acc/generation, cal/min	296						
	Revised Accigeneration, califilm	290						
42.50	Motor Datum Tomon Dog C	7.2	Oil Da	sturn Tones Dog C	70.0			
13:56	Water Return Temp, Deg C bucket ck volume, ml	7.2 1000		eturn Temp, Deg C et ck volume, ml	78.9 1000			+
	Bucket ck volume, mi	57.75		et ck volume, mi et ck time, sec	1000			
		1039	DUCK					
	Flow rate, ml/min	1039 2286		Flow rate, ml/min	596 -4395			_
	Enthalpy change, calorie/min:	∠∠50	Entha	lpy change, calorie/min:	-4293			
	Flook Top Surface Terra	CO 4	Fig1-	hottom Curfors Tarra	70.0			+
	Flask Top Surface Temp., C	<b>69.4</b> 157		bottom Surface Temp., C	<b>78.8</b> 174			-
	Flask Top Surface Temp., F			bottom Surface Temp., F	1/4 86			+
	Air Temp. ,F	86		emp. ,F				
	Overall HT coef. Btu/hr/F/sq ft	2.75		all HT coef.	2.75			
	Top flask Area, in^2	188		m flask Area, in^2	265			
	emisivity	0.94	emisi		0.94			
	Convective Loss, cal/min	1069		ective Loss, cal/min	1867			
	Radiative Loss, cal/min	494		itive Loss, cal/min	903	1000		
	Flask top Heat Loss, cal/min	1564	Flask	bottom Heat Loss, cal/min	2770	4333		
	Reactor Temperature, C	83.8		as Temp. Deg C.	31			44
	Peroxide Temperature, F	86		low Rate, gm/min	0.001		Correlated losses, cal/min	4176
	Peroxide Flow Rate, ml/min	0		r Vap. gm/min	0.0000		Reflux Gas Delta H, cal/min	2_
	Peroxide heat Cap, cal/gm/degC	0.8	P1 los	ss, H2O vapor, cal/min	0.02		Revised Acc/generation, cal/min	217
	Peroxide Enthalpy Change, cal/mi	0.0	1				İ	1
								+

O.Kiaa								
S Kujawa 8/20/2003			Reactor	Chargo	$\overline{}$			
8/20/2003			Reactor	Charge				
TEST RUN	F-21							
IESI KUN	Г-21	SURROGATE		Target			Actual	
0		SURRUGATE	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Component	Ohanna		Grams 150	willinters	MICTO L	Grams	willinters	MICTOL
	Charge:		100					
			120.0442	120.04		120.295		
water						2.082		
hydraulic oil			2.0938 2.0938	2.38 2.38		2.062		
cutting oil			2.0938	2.38		2.159		
Al2O3			0.3349	0.08	83.9	0.3354		
CaO			0.5413	0.16	163.0	0.5407		
Cr2O3			0.2326	0.10	44.6	0.2339		
Fe2O3			1.3032	0.44	435.1	1.3030		
MgO			0.7269	0.38	375.9	0.7277		
MnO			0.4254	0.08	82.1	0.4257		
SiO2			8.3907	3.71	3712.7	8.3909		
Na3PO4			12.2584	4.83	4831.8	12.2583		
KOH			0.3224	0.16	157.8	0.3229		
Hg			0.0516	0.00	3.8	0.0638		
i ig			0.0310	0.00	3.0	0.0000		-
Aroclor-1260			0.0070	0.0045	4.5	0.005		
A100101-1200			0.0070	0.0043	4.5	0.000		
TCE			0.8431	0.58	577.5	0.8525		580
PCE			0.0747	0.05	45.8	0.0735		46
TCA			0.0941	0.03	70.2	0.0810		70
BEHP			0.1619	0.07	165.2	0.1624		170
	Total:		150.0	135.56	100.2	150.3		170
	Total.		150.0	100.00		100.0		
		REAGENTS						
Component			Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
HCB						0.0069		
BP						0.0035		
FeSO4 7H2O			1.5			1.502		
H2O2 (50%)			300	250		300	250	
H2SO4 (con)						15.2994		
NaOH (4 M)						7.074		
1	Total:		451.5			474.2		

	S Kujawa													
	8/20/2003													
	0/20/2003													
	TEST RUN	F-21												
Run Time	Gas Vol. cc	Time, sec	accm	Temp, C	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum		Rctr T
				• /	psia		lb/ft^3	0	min.	gm/min	gm	gm		Deg C
											-	_		
9:00		1	0	22	12.08	31.5	0.067	0.000	0.0	0.000	0.00	0.0		86.6
9:05	50	12.94	232	22	12.08	31.5	0.067	0.248	5.0	0.124	0.62	0.6		85.7
9:15	50	8.25	364	21	12.08	31.5	0.067	0.391	10.0	0.320	3.20	3.8		90.1
9:30	50	7.75	387	20	12.08	31.5	0.067	0.417	15.0	0.404	6.06	9.9		91.2
9:45	50	7.78	386	21.5	12.08	31.5	0.067	0.413	15.0	0.415	6.23	16.1		90.8
10:00	50	7.53	398	22	12.08	31.5	0.067	0.426	15.0	0.420	6.30	22.4		91.4
10:15	50	7.97	376	22	12.08	31.5	0.067	0.403	15.0	0.414	6.22			90.7
10:30	50	7.75	387	23	12.08	31.5	0.067	0.413	15.0	0.408	6.12	34.7		90.4
10:45	50	7.94	378	22.5	12.08	31.5	0.067	0.403	15.0	0.408	6.12	40.9		90.7
11:00	50	10.88	276	23	12.08	31.5	0.066	0.294	15.0	0.349	5.23	46.1		88.3
11:15	50	10	300	21	12.08	31.5	0.067	0.322	15.0	0.308	4.62	50.7		90.1
11:30	50	11.1	270	24	12.08	31.5	0.066	0.287	15.0	0.291	4.36	55.1		90
11:45	50	14.37	209	23	12.08	31.5	0.067	0.223	15.0	0.255	3.83	58.9		90.1
12:00	50	20.15	149	24	12.08	31.5	0.066	0.158	15.0	0.190	2.86	61.8		88.8
12:15	50	23.03	130	23.5	12.08	31.5	0.066	0.139	15.0	0.148	2.23	64.0		88.2
12:30	50	32.78	92	24	12.08	31.5	0.066	0.097	15.0	0.118	1.77	65.7		86.7
12:45	50	44.72	67	25	12.08	31.5	0.066	0.071	15.0	0.084	1.26	67.0		85.1
13:00	50	63.04	48	25.5	12.08	31.5	0.066	0.050	15.0	0.061	0.91	67.9		84.6
13:15	10	15.44	39	26	12.08	31.5	0.066	0.041	15.0	0.046	0.68	68.6		84.1
13:30	10	18.85	32	26	12.08	31.5	0.066	0.034	15.0	0.037	0.56	69.2		83.7
13:45	10	18.44	33	26.5	12.08	31.5	0.066	0.034	15.0	0.034	0.51	69.7		83.8
14:00	10	28.35	21	26	12.08	31.5	0.066	0.022	15.0	0.028	0.43	70.1		83.3
14:15	10	39.81	15	26	12.08	31.6	0.066	0.016	15.0	0.019	0.29	70.4		83
14:30	10	52.6	11	26.5	12.08	31.6	0.066	0.012	15.0	0.014	0.21	70.6		82.8
14:45	10	76.97	8	26.5	12.08	31.6	0.066	0.008	15.0	0.010	0.15	70.8		82.7
15:00	3	25.09	7	27	12.08	31.5	0.066	0.008	15.0	0.008	0.12	70.9		82.7
15:15	0	1	0	27	12.08	31.5	0.066	0.000	15.0	0.004	0.06	70.9		82.8
15:30	0	1	0	27	12.08	31.5	0.066	0.000	15.0	0.000	0.00			83.2
15:45	0	1	0	27	12.08	31.4	0.066	0.000	15.0	0.000	0.00			83
16:00	0	1	0	27.5	12.08	31.4	0.065	0.000	15.0	0.000	0.00			83
16:15	0	1	0	27.5	12.08	31.4	0.065	0.000	15.0	0.000	0.00			83
16:30	0	1	0	28	12.08	31.4	0.065	0.000	15.0	0.000	0.00			83.3
16:45	0	1	0	28	12.08	31.4	0.065	0.000	15.0	0.000	0.00			83.4
17:00	0	1	0	28.5	12.08	31.4	0.065	0.000	15.0	0.000	0.00			83.3
		- i			12.00									
			185				Avg's:	0.145	480.0			69.6	Avg:	86.2

	S Kujawa									T
	8/27/2003									
	TEST RUN	F-21								
Run Time	% O2	% CO2	% H2O	% CO	PPMv TCE	PPMv PCE	PPMv TCA	MW		
9:00		0.4307%	4%	0.0001%	309	9.9	90.8	31.5		
9:05		0.5168%	4%	0.0004%	309	9.9	90.8	31.5		
9:15		0.6052%	4%	0.0011%	169.25			31.5		
9:30		0.6936%	4%	0.0022%	29.5	10.6	1.55	31.5		
9:45		0.5845%	4%	0.0030%	18.75			31.5		
10:00		0.4754% 0.4831%	4%	0.0036% 0.0042%	8	9	1.55	31.5 31.5		
10:15			4% 4%		8		4 55	31.5		
10:30 10:45		0.4908% 0.4576%	4%	0.0011% 0.0015%	8	7	1.55	31.5		
11:00			4%	0.0015%			4.55	31.5		
11:15		0.4244% 0.5452%	4%	0.0030%	<b>8</b> 8	7	1.55	31.5		+
11:30		0.6659%	4%	0.0044%	8	7	1.55	31.5		+
11:45		0.5105%	4%	0.0048%	8		1.00	31.5		+
12:00		0.3551%	4%	0.0048%	8	7	1.55	31.5		+
12:15		0.5109%	4%	0.0046%	8	- '	1.55	31.5		+
12:30		0.6667%	4%	0.0040%	8	7	1.55	31.5		
12:45		0.5217%	4%	0.0032%	8		1.00	31.5		
13:00		0.3766%	4%	0.0032%	8	7	1.55	31.5		+
13:15		0.5035%	4%	0.0032%	8	- '	1.00	31.5		+
13:30		0.6303%	4%	0.0032%	8	7	1.55	31.5		+
13:45		0.7160%	4%	0.0047%	8		1.00	31.5		+
14:00		0.8016%	4%	0.0062%	8	7	1.55	31.5		+
14:15		1.1972%	4%	0.0062%	8	· ·		31.6		
14:30		1.5927%	4%	0.0062%	8	7	1.55	31.6		
14:45		1.1721%	4%	0.0171%	8			31.6		
15:00		0.7515%	4%	0.0280%	8	7	1.55	31.5		
15:15		0.7246%	4%	0.0280%	8			31.5		
15:30		0.4687%	4%	0.0197%	8			31.5		+
15:45		0.2265%	4%	0.0113%	8			31.4		
16:00		0.2146%	4%	0.0113%	8	7	1.55	31.4		
16:15	95.6%	0.2128%	4%	0.0113%	8			31.4		
16:30	95.6%	0.2109%	4%	0.0113%	8	7	1.55	31.4		
16:45	95.6%	0.2001%	4%	0.0113%	8.35			31.4		
17:00	95.6%	0.1893%	4%	0.0113%	8.7	7	1.55	31.4		

	S Kujawa													
	8/27/2003													
	TEST RUN	F-21												
	Instantaneou								quantities:					
	O2, gm/min	CO2, g/m	H2O g/m	CO g/m	TCE g/m	PCE g/m	TCA g/m	O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
9:00	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	0.000	0.000	0.000	0.000	0.000		0.00E+00
9:05	0.2403	0.0018	0.0060	8.14E-07	3.19E-04	0.0000	0.0001	0.601	0.004	0.015	0.000	0.001	3.24E-05	
9:15	0.3778	0.0033	0.0094	3.84E-06	2.75E-04	0.0000	0.0000		0.030	0.091	0.000	0.004		
9:30	0.4032	0.0040	0.0100	8.21E-06	5.12E-05	0.0000	0.0000		0.085	0.237	0.000	0.006		
9:45	0.4001	0.0034	0.0099	1.10E-05	3.23E-05	0.0000	0.0000		0.141	0.386	0.000	0.007	4.47E-04	
10:00	0.4131	0.0028	0.0102	1.37E-05	1.42E-05	0.0000	0.0000		0.187	0.537	0.000	0.007		
10:15	0.3903	0.0027	0.0097	1.50E-05	1.34E-05	0.0000	0.0000		0.229	0.686	0.001	0.007		
10:30	0.4000	0.0028	0.0099	4.04E-06	1.37E-05	0.0000	0.0000		0.271	0.833	0.001	0.008		
10:45	0.3912	0.0026	0.0097	5.30E-06	1.34E-05	0.0000	0.0000		0.311	0.980	0.001	0.008		
11:00	0.2851	0.0017	0.0071	7.72E-06	9.79E-06	0.0000	0.0000		0.344	1.106	0.001	0.008		
11:15	0.3119	0.0025	0.0077	1.27E-05	1.07E-05	0.0000	0.0000		0.375	1.217	0.001	0.008		
11:30	0.2778	0.0027	0.0069	1.23E-05	9.56E-06	0.0000	0.0000		0.414	1.326	0.001	0.008		
11:45	0.2157	0.0016	0.0053	9.51E-06	7.41E-06	0.0000	0.0000	57.234	0.446	1.418	0.001	0.008		
12:00	0.1535	0.0008	0.0038	6.76E-06	5.27E-06	0.0000	0.0000		0.463	1.486	0.002	0.009		
12:15	0.1343	0.0010	0.0033	4.93E-06	4.62E-06	0.0000	0.0000		0.477	1.540	0.002	0.009		
12:30	0.0941	0.0009	0.0023	2.77E-06	3.24E-06	0.0000	0.0000		0.491	1.582	0.002	0.009		
12:45	0.0688	0.0005	0.0017	2.02E-06	2.37E-06	0.0000	0.0000		0.502	1.613	0.002	0.009		
13:00	0.0488	0.0003	0.0012	1.43E-06	1.68E-06	0.0000	0.0000	65.979	0.507	1.634	0.002	0.009		
13:15	0.0397	0.0003	0.0010	1.17E-06	1.37E-06	0.0000	0.0000	66.643	0.512	1.651	0.002	0.009	1.47E-03	9.24E-04
13:30	0.0325	0.0003	0.0008	9.57E-07	1.12E-06	0.0000	0.0000		0.516	1.664	0.002	0.009		
13:45	0.0331	0.0003	0.0008	1.43E-06	1.14E-06	0.0000	0.0000		0.521	1.677	0.002	0.009		
14:00	0.0216	0.0003	0.0005	1.23E-06	7.44E-07	0.0000	0.0000		0.525	1.687	0.002	0.009		
14:15	0.0153	0.0003	0.0004	8.78E-07	5.30E-07	0.0000	0.0000		0.529	1.694	0.002	0.009		
14:30	0.0115	0.0003	0.0003	6.63E-07	4.00E-07	0.0000	0.0000		0.533	1.699	0.002	0.009		
14:45	0.0079	0.0001	0.0002	1.25E-06	2.74E-07	0.0000	0.0000	68.712	0.536	1.702	0.002	0.009		
15:00	0.0073	0.0001	0.0002	1.88E-06	2.51E-07	0.0000	0.0000		0.538	1.705	0.002	0.009		
15:15	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000		0.538	1.706	0.002	0.009		
15:30	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000		0.538	1.706	0.002	0.009		
15:45	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	68.880	0.538	1.706	0.002	0.009		
16:00	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	68.880	0.538	1.706	0.002	0.009		
16:15	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	68.880	0.538	1.706	0.002	0.009	1.51E-03	9.32E-04
16:30	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000		0.538	1.706	0.002	0.009		
16:45	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000		0.538	1.706	0.002	0.009		
17:00	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	68.880	0.538	1.706	0.002	0.009	0.00151	0.00093
								O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
								Sum of cor	nponents=	71,14				
										VOC in gas/\	/OC fed	1.03%	2.06%	1.15%

S Kujawa			I						
8/20/2003				Test Results	Str RPM:		Start		
0/20/2003					OU KEW.		Start		
TEST RUN	F-21								
ILOT KOK	Results								
	Product slurry Sp. Gr.:	1.05							
	Final Product Slurry, ml:	370							
	Tillari Todact Glarry, IIII.	0.0							
	Final Product Slurry, gm:	390.1							
	Dewar Flask net wt., gm	0.3031							
	Liquid/slurry Product, gm:			(Slurry Wt, 100% H2O2/O2 RXN):	404				
				(,					
	Product Gas Weight, gm:	70.9							
	0 ,0								
	Product Wt, gm:	461.3							
	Total Charge Weight, gm:	474.2							
	Overall Mass Balance								
	Mass Balance Closure:	97.3%							
	Mass balance w/o gas:	82%							
	Species Mass Results			Species Mass Results					
	T. O. I. E. I.								
	TriChloroEthylene	2.050		HexachloroBenzene	0.700	Anal. code			
	Slurry analysis, 1, mg/kg:	0.952		Slurry analysis, 1, mg/kg:	0.736				
	Slurry analysis, 2, mg/kg:	0.740 0.846		Slurry analysis, 2, mg/kg:	0.818 0.777				
	Avg., mg/kg	0.846		Avg., mg/kg	0.777				
	Total, mg:	0.550		Total, mg:	0.505				
	TCE, DRE, %	99.96%		HCB, DRE, %	95.61%				
	TCE, DRE, 76	33.3076		HCB, DRE, 76	30.0170				
	TetraChloroEthylene			Bi-Phenyl					
	Slurry analysis, 1, mg/kg:	1.960	11	Slurry analysis, 1, mg/kg:	4.940	LI			
	Slurry analysis, 1, mg/kg:	1.950		Slurry analysis, 1, mg/kg:	4.450				
	Avg., mg/kg			Avg., mg/kg	4.695				
	Total, mg:	0.763		Total, mg:	1.832				
	, stan, mg	5,,, 5,		Total, mg					
	PCE, DRE, %	98.96%		BP, DRE, %	47.67%		Run time:	8	Hours
		1					Run Temp	86.2	deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol:	250	ml
	Slurry analysis, 1, mg/kg:	1.960		Slurry analysis, 1, mg/kg:	2.600				
	Slurry analysis, 2, mg/kg:	1.950		Slurry analysis, 2, mg/kg:					
·	Avg., mg/kg			Avg., mg/kg	2.600				
	Total, mg:	0.763		Total, mg:	1.014				
		<u></u>			L				
	TCA, DRE, %	99.06%		Aroclor, DRE, %	79.71%				
	BEHP								
	Slurry analysis, 1, mg/kg:	22.800							
	Slurry analysis, 2, mg/kg:								
	Avg., mg/kg								
	Total, mg:	9.460							
	25.12.225.24	]							
	BEHP, DRE, %	94.17%							

S Kujawa						
8/20/2003		Heat Ba	ance			
TEST RUN	F-21					
	Condenser Bath		Oil Bath			
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100		
		The hea	t balance and heat generation calculations are	1001		
		uncertai		very		
			n ack of physical properties for the heating oil. Eff	orte are		_
			ade to determine operating heat capacities and			_
		being in	ade to determine operating heat capacities and	densities.		_
			Boss DS oil density, gm/ml	0.873		
			Boss DS oil density, griffill Boss DS oil heat cap. cal/gm/deg C	0.873		_
			2000 DO OII Fleat cap. cargifildeg C	0.4		
10:45	Water Return Temp, Deg C	6.7	Oil Return Temp, Deg C	80.1		
	bucket ck volume, ml	1000	bucket ck volume, ml	1000		_
	Bucket ck time, sec	63.06	Bucket ck time, sec	94.5		
	Flow rate, ml/min	951	Flow rate, ml/min	635		
	Enthalpy change, calorie/min:	1618	Enthalpy change, calorie/min:	-4412		
			1, 5,			
	Flask Top Surface Temp., C	67.9	Flask bottom Surface Temp., C	72.6		
	Flask Top Surface Temp., F	154	Flask bottom Surface Temp., F	163		
	Air Temp. ,F	76.5	Air Temp. ,F	76.5		
	Overall HT coef. Btu/hr/F/sqft	2.75	Overall HT coef.	2.75		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	1172	Convective Loss, cal/min	1832		
	Radiative Loss, cal/min	525	Radiative Loss, cal/min	840		
	Flask top Heat Loss, cal/min	1697	Flask bottom Heat Loss, cal/min	2672	4369	
		00 -	D10 T D 0	24.5		
	Reactor Temperature, C	90.7	P1 Gas Temp. Deg C.	24.5		
	Peroxide Temperature, F	76.5 <b>2</b>	Gas Flow Rate, gm/min	0.408 0.0120		
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	0.8	Water Vap. gm/min P1 loss, H2O vapor, cal/min	J 0.0120[ 6.69		
	Peroxide heat Cap, cal/gm/degC  Peroxide Enthalpy Change, cal/mir		F Floss, H2O vapor, cal/min	0.09		
	refoxide Enthalpy Change, cal/mir	120.1				
			Accumulation/Generation, cal/min	-1708		_
			Accumulation/Generation, cal/min	-1700		_
	Correlated losses, cal/min	4608				_
	Reflux Gas Delta H, cal/min	701				
	Revised Acc/generation, cal/min	-1023				

S Kujawa										
5 Kujawa 7/23/2003				E,	eactor Charge	<del></del>				
112312003					actor Onlarge					
TEST RUN	F-9									
IESTRUN	F-9		OLIDBOOAT	_	T			0 -41		
			SURROGAT		Target	P.41 1		Actual		
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L	
	Charge:			150						
water				120.0442	120.04		120.346			
hydraulic oil				2.0938	2.38		2.040			
cutting oil				2.0938	2.38		2.046			
IsoOctane							none			
Al2O3				0.3349	0.08	83.9	0.3355			
CaO				0.5413	0.16	163.0	0.5409			
Cr2O3				0.2326	0.04	44.6	0.2330			
Fe2O3				1.3032	0.44	435.1	1.3033			
MgO				0.7269	0.38	375.9	0.7273			
MnO				0.4254	0.08	82.1	0.4258			
SiO2				8.3907	3.71	3712.7	8.3911			
Na3PO4				12.2584	4.83	4831.8	12.2580			
KOH				0.3224	0.16	157.8	0.3218			
Hg				0.0516	0.00	3.8	0.054		4	
Aroclor-1260		Number of	Vials:				none			
I										
TCE				0.8431	0.58	577.5	0.847		580	
PCE				0.0747	0.05	45.8	0.075		46	
TCA				0.0941	0.07	70.2	0.094		70	
BEHP				0.1619	0.17	165.2	0.167		170	
DEITI	Total:			150.0	135.55	100.2	150		170	
	Total.			150.0	100.00		150			
			REAGENTS							
			REAGENTS							
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L	
Component				Gianis	Willingers	WIICIOL	Gianis	wiiiiiiteis	WICIOL	
HCB				0.0056			0.0060			
BP BP				0.0030			0.0035			
ال		-		0.0029			0.0035			
FeSO4 7H2O				1.5			1.5002			
1 6304 / 1720				1.5			1.5002			
H2O2 (50%)				480	400		480	400		
mzUZ (30%)				460	400		460	400		
112604 ()		-	-				42.0570			
H2SO4 (con)							13.2572			
NI-OLL (4 M)							4 000			
NaOH (4 M)							4.886			
	T-4-1	-		004.5						
	Total:			631.5			650			

										1				
	S Kujawa						<u> </u>							
	7/24/2003					s Phase								
					Dat	a/Calculati	ons							
	TEST RUN	F-9												
	Results		Gas Phase	Calculation	ns									
Run Time	Gas Vol, cc	Time, sec	accm	Temp, F	P baro	MW	Density					Mass sum		Rctr T
					psia		lb/ft^3	0		gm/min	gm	gm		Deg C
9:00					12.12		0.077	0.000		0.000				
9:05					12.12		0.077	0.000		0.000				79.5
9:15	50	15.04		73	12.12		0.066	0.212		0.106		1.1		82.9
9:30	50	10.44		73	12.12		0.066	0.306		0.259				86.3
9:45	50	8.85		73	12.12		0.066	0.361	15.0	0.333		9.9		87.8
10:00	50	8.22	365	80	12.12		0.065	0.383	15.0	0.372	5.577	15.5		89
10:15	50	8.16		86	12.12		0.065	0.382	15.0	0.382	5.736			89.2
10:30	50	8.15	368	83	12.12		0.065	0.384		0.383	5.745			89.1
10:45	50	7.31	410	80	12.12		0.065	0.431		0.408	6.113			89.5
11:00	50	7.29		88	12.12		0.065	0.426		0.428	6.424			90
11:15	50	7.31	410	86	12.12		0.065	0.426		0.426	6.388	45.9		89.9
11:30	50	6.78		86	12.12		0.065	0.459		0.443	6.641	52.6		89.9
11:45	50	6.81	441	87	12.16		0.065	0.458		0.459	6.881	59.4		89.8
12:00	50	6.66		93	12.16		0.064	0.463		0.461				89.8
12:15	50	6.82		90	12.16		0.064	0.455		0.459				89.9
12:30	50	7.4	405	88	12.16		0.065	0.421	15.0	0.438	6.567	79.8		90.2
12:45	50	8.47	354	90	12.16		0.064	0.366		0.393	5.902	85.7		89.7
13:00	50	10.69	281	90	12.16		0.064	0.290	15.0	0.328	4.923	90.6		89.1
13:15	50	11.82		90	12.16		0.064	0.262		0.276				88.7
13:30	50	12.12		85	12.16		0.065	0.258		0.260				87.6
13:45	50	16.91	177	95	12.16		0.064	0.182		0.220	3.301	102.0		87
14:00	50	19.34		95	12.16		0.064	0.159		0.170				86.6
14:15	50	20.87	144	94	12.16		0.064	0.148		0.153				86.6
14:30	50	26.62		90	12.16		0.064	0.117	15.0	0.132	1.981	108.8		86.2
14:45	20	12.34	97	94	12.16		0.064	0.100		0.108				85.9
15:00	10	8.31	72	91	12.16		0.064	0.075		0.087	1.308			85.2
15:15	10	9.66	62	91	12.13		0.064	0.064		0.069				84.9
15:30	10	12.44	48	91	12.13		0.064	0.050		0.057	0.852			84.9
15:45	10	16.87	36	93	12.13		0.064	0.036		0.043				83.5
16:00	10	25.47	24	93	12.13		0.064	0.024		0.030				83.2
16:15	5	18.63	16	89	12.13		0.064	0.017	15.0	0.020	0.306	115.0		82.8
16:30	5	18.5		87	12.13		0.065	0.017	15.0	0.017		115.3		82.9
16:45	5	17.54	17	92	12.13		0.064	0.018		0.017				83.3
17:00	10	46.88	13	87	12.13	31.3	0.065	0.013		0.015	0.231	115.8		83.6
							Avg's:	0.228	480.0			109.6	Avg:	86.8
	the percents and													
Run Time	% O2	% CO2	% H2O	% CO	PPMv TCE	PPMv PCE	PPMv TCA	MW						
9:45	95%	0%	5%	0%	5	5	5	31.3						

C Kuigua	T									
S Kujawa				Test Results	1	C4= DDM	288			
7/23/2003				Test Results		Str RPM:	288			
					•					
TEST RUN	F-9									
	Results									
	Product slurry Sp. Gr.:	1.04								
	Final Product Slurry, ml:	500								
	Final Product Slurry, gm:	520.8								
	Dewar Flask net wt., gm	0.9756								
	Liquid/slurry Product, gm:	521.8		(Slurry Wt, 100% H2O2/O2	DVII).	537				
	Liquid/sidity Froduct, gitt.	321.0		(Sidify VVI, 1007/8 11202/02	ixxiv).	337				
	Dan divet Con Mainlet aver	445.0								
	Product Gas Weight, gm:	115.8								
	Product Wt, gm:	637.6								
	Total Charge Weight, gm:	650								
	Overall Mass Balance									
	Mass Balance Closure:	98.1%								
-										
<u> </u>	Mass halanas w/a gas:	80%								
-	Mass balance w/o gas:	00%								
	Species Mass Results			Species Mass Result	ts					
	TriChloroEthylene			HexachloroBenzene						
	Slurry, mg/kg:	2	Less Than							
	Gas Phase, mg:	0.00E+00								
	Dewar, mg:									
	Slurry, mg:	1.0416		clur	rry ,mg:	thd				
	Total, mg:	1.04E+00		Siui	iry ,iiig.	IDG				
	Total, mg.	1.046700								
	TCE, DRE, %	99.88%		HCB, DRE, %		#VALUE!				
	TetraChloroEthylene			Bi-Phenyl						
	Slurry, mg/kg:	2	Less Than							
	Gas Phase, mg:	0.00E+00								
	Dewar, mg:									
	Slurry, mg:	2.00E+00		clur	rry ,mg:	thd				
	Total, mg:	2.00E+00		Sidi	, ,g.			Run time:	Q.	Hours
	Total, mg.	2.00L+00						Run Temp:	00.0	deg C
	DOE DDE W	07.000/		DD DDE W		40.000.0000			400	ueg
	PCE, DRE, %	97.33%		BP, DRE, %		#VALUE!		H2O2 vol:	400	m
	1,1,1-TriChloroEthane			Aroclor 1260						
	Slurry, mg/kg:		Less Than							
	Gas Phase, mg:	0.00E+00								
	Dewar, mg:									
	Slurry, mg:	2.00E+00		slur	rry ,mg:					
	Total, mg:	2.00E+00			, , 3.					
	TCA, DRE, %	97.87%		Aroclor, DRE, %		#VALUE!				
<u> </u>	IOA, DICE, 70	<i>31.017</i> 6		AIGGIOI, DIXL, 70		"VALUE!				
	DELID									
	BEHP									
	Slurry, mg:									
		tbd								
	BEHP, DRE, %	#VALUE!								
	,,,			I .				l		

Kujawa			Heat Balance			
7/29/2003			rieat Dalatice			
ST RUN	F-9				numbers in red are questionable	
	Condenser Bath		Oil Bath			
	Condenser Batri		Oli Batri			
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100		
	Cot Fount Temperature; Beg c		Cott ont remperature, beg c	100	Since only one data point on retu	
Time			Boss DS oil density, gm/ml	0.873	temperatures was collected for the	
			Boss DS oil heat cap, cal/gm/deg C		was collected before peroxide inj	
					point provides another estimate	
8:40	Water Return Temp, Deg F	46	Oil Return Temp, Deg C	76.9	heat loss and heat transfer coeffi	cient, only.
	bucket ck volume, ml	1000	bucket ck volume, ml	100		
	Bucket ck time, sec	28.5	Bucket ck time, sec	9.87		
-	Flow rate, ml/min	2105	Flow rate, ml/min	608		
	Enthalpy change, calorie/min:	5848	Enthalpy change, calorie/min:	-4904		
	Flask Top Surface Temp., F	148	Flask bottom Surface Temp., F	170		
	Air Temp. ,F	73	Air Temp. ,F	72		
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	1131	Convective Loss, cal/min	2272		
	Radiative Loss, cal/min	494	Radiative Loss, cal/min	964		
	Flask top Heat Loss, cal/min	1625	Flask bottom Heat Loss, cal/min	3236	4861	
	Reactor Temperature, C	79.5	P1 Gas Temp. Deg C.	31		
	Peroxide Temperature, F	73	Gas Flow Rate, gm/min	0.000	Correlated losses, cal/min	4176
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0000	Reflux Gas Delta H, cal/min	0
	Peroxide heat Cap, cal/gm/de	0.8	P1 loss, H2O vapor, cal/min	0.00	Revised Acc/generation, cal/min	728
	Peroxide Enthalpy Change, ca	0.0				
			1 1 10 11 11	5005		
			Accumulation/Generation, cal/min	-5805		
	8/8/2003:					
		o to be considered	d incorrect due to uncertainty of the conde	ncor water flow	rates through rup E 6	

S Kujawa									
7/23/2003				React	or Charge				
TEST RUN	F-8								
		SURRO	GATE		Target			Actual	
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
	Charge:			150					
water				120.0442	120.04		400.000		
hydraulic oil				2.0938	2.38		102.236 2.067		
cutting oil				2.0938	2.38		1.958		
IsoOctane				2.0936	2.30				
ISOUCIANE							none		
Al2O3				0.3349	0.08	83.9	0.3357		
CaO				0.5413	0.16	163.0	0.5409		
Cr2O3				0.2326	0.10	44.6	0.2332		
Fe2O3				1.3032	0.44	435.1	1.3035		
MgO				0.7269	0.38	375.9	0.7270		
MnO				0.4254	0.08	82.1	0.4250		
SiO2				8.3907	3.71	3712.7	8.3898		
Na3PO4				12.2584	4.83	4831.8	12.2587		
КОН				0.3224	0.16	157.8	0.3221		
Hg				0.0516	0.00	3.8	0.054		4
l i g				0.0010	0.00	0.0	0.004		
Aroclor-1260		Number of Vials:					none		
7.100.01 1200		Trainibor or Viaio.					Holic		
TCE				0.8431	0.58	577.5	0.847		580
PCE				0.0747	0.05	45.8	0.075		46
TCA				0.0941	0.07	70.2	0.094		70
BEHP				0.1619	0.17	165.2	0.167		170
	Total:			150.0	135.55		132		
		REAGE	NIS						
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
НСВ				0.0056			0.0065		
BP				0.0029			0.0034		
				0.0029			0.0034		
FeSO4 7H2O				1.5			1.4987		
				1.0					
H2O2 (50%)				600	500		600	500	
()				,,,,					
H2SO4 (con)							12.2109		
							12.2109		
NaOH (4 M)							2.905		
	Total:			751.5			749		

	C Kuisuus												
	S Kujawa 7/24/2003				Gas P		_						
	112412003					alculations							
	TEST RUN	F-8			Data/C	aculations							
	IESI KUN	F-8											
	Results		Gae Bhaec	Calculatio	ne								
	Results		Gas Fliase	Calculatio	118								
Run Time	Gas Vol. cc	Time sec	accm	Temp, F	P baro	MW	Density	qm/min	Time delta	Rate avg	Mass delta	Mass sum	Rctr T
rtuii iiiio	Cus voi, cc	111110, 300	ucciii	romp, r	psia		lb/ft^3	0	min.	gm/min	gm	gm	Deg C
9:45				78	12.16	31.3	0.066	0.000	111111.	0.000		0.0	Dog C
9:50	50	27.25	110	78	12.16	31.3	0.066	0.116	5.0	0.058		0.3	79.4
10:00	50	12.37	243	78	12.16	31.3	0.066	0.256		0.186		2.2	82.0
10:15		8.37	358	78	12.16	31.3	0.066	0.379		0.318		6.9	85.8
10:30	50	6.65		78	12.16	31.3	0.066	0.477	15.0	0.428	6.418	13.3	87.6
10:45	50	6.31	475	81	12.16	31.3	0.066	0.500	15.0	0.488	7.325	20.7	88.3
11:00		5.87	511	87	12.16	31.3	0.065	0.531	15.0	0.516		28.4	88.6
11:15	50	5.85	513	87	12.16	31.3	0.065	0.533	15.0	0.532	7.984	36.4	88.8
11:30		5.53	542	87	12.16	31.3	0.065	0.564	15.0	0.549	8.229	44.6	88.8
11:45	50	5.9		89	12.16	31.3	0.065	0.527	15.0	0.545	8.181	52.8	89.4
12:00	50	6.16	487	89	12.16	31.3	0.065	0.505	15.0	0.516	7.734	60.5	89.6
12:15		6.63	452	90	12.16	31.3	0.064	0.468		0.486		67.8	89.5
12:30		6.47	464	91	12.16	31.3	0.064	0.479		0.473		74.9	89.5
12:45	50	6.63	452	92	12.16	31.3	0.064	0.466	15.0	0.472		82.0	89.2
13:00	50	5.9	508	93	12.16	31.3	0.064	0.523	15.0	0.495	7.418	89.4	89.1
13:15	50	6.16	487	93	12.16	31.3	0.064	0.501	15.0	0.512	7.678	97.1	89.0
13:30	50	6.34	473	93	12.16	31.3	0.064	0.487	15.0	0.494	7.406	104.5	89.1
13:45	50	5.94	505	93	12.16	31.3	0.064	0.519	15.0	0.503	7.545	112.1	89.2
14:00	50	8.56	350	94	12.16	31.3	0.064	0.360	15.0	0.440	6.594	118.6	89.2
14:15	50	9.87	304	90	12.16	31.3	0.064	0.314	15.0	0.337	5.056	123.7	88.7
14:30	50	13.97	215	90	12.16	31.3	0.064	0.222	15.0	0.268	4.023	127.7	88.1
14:45	50	38.53	78	91	12.16	31.3	0.064	0.080	15.0	0.151	2.268	130.0	86.9
15:00	50	50.66	59	91	12.16	31.3	0.064	0.061	15.0	0.071	1.061	131.1	86.9
15:15	50	42.12	71	91	12.16	31.3	0.064	0.074	15.0	0.067	1.010	132.1	85.9
15:30	2	7.85	15	92	12.16	31.3	0.064	0.016	15.0	0.045	0.669	132.7	85.5
15:45	1.5	8.34	11	92	12.16	31.3	0.064	0.011	15.0	0.013	0.202	132.9	84.5
16:00	0					31.3	0.000	0.000	15.0	0.006	0.083	133.0	84.2
16:15	0					31.3	0.000	0.000	15.0	0.000	0.000	133.0	83.8
16:30						31.3	0.000	0.000		0.000		133.0	83.5
16:45	0					31.3	0.000	0.000	15.0	0.000	0.000	133.0	83.0
17:00	0					31.3	0.000	0.000	15.0	0.000	0.000	133.0	83.0
17:15	0								15.0	0.000	0.000	133.0	83.2
17:30	0					31.3	0.000	0.000	15.0	0.000	0.000	133.0	83.3
17:45	0					31.3	0.000	0.000	15.0	0.000	0.000	133.0	83.3
								0.272	480.0			130.5	86.5
	the percents a	nd PPMv b	elow are du	mmy numbe	ers pendina Go	C/MS results							
Run Time	% O2	% CO2	% H2O	% co	PPMv TCE	PPMv PCE	PPMv TCA	MW					
0.45	050/	00/	E0/	00/	-	-	-	24.2					
9:45	95%	0%	5%	0%	5	5	5	31.3					

S Kujawa								
7/23/2003				Test Results		Str RPM:	480	
EST RUN	F-8							
	Results Product slurry Sp. Gr.:	1.04						
	Final Product Slurry, ml:	567						
	Tillar Froduct Glarry, IIII.	307						
	Final Product Slurry, gm	589					1	
	Dewar Flask net wt., gm	0.9865			İ			
	Liquid/slurry Product, gm	590.0		(Slurry Wt, 100% H2O2/O2 RXN):	607			
	Product Gas Weight, gm	133.0						
	Product Wt, gm:	723						
	T						,	
	Total Charge Weight, gm:	749						<u> </u>
	Overall Mass Balance				+			
	Mass Balance Closure:	96.6%						
	Wass Balance Glosure.	30.070						
	Mass balance w/o gas:	79%						
					1		I .	
	Species Mass Results			Species Mass Results				
			·				1	
	TriChloroEthylene			HexachloroBenzene				
	Slurry, mg/kg:	2	Less Than					
	Gas Phase, mg:							
	Dewar, mg:							
	Slurry, mg:	1.178		slurry ,mç	j: tbd			
	Total, mg:	1.18E+00			1			<del>                                     </del>
	TCE, DRE, %	99.86%		HCB, DRE, %	#VALUE!			
	ICE, DRE, %	39.00%		HCB, DRE, 76	#VALUE!			
	TetraChloroEthylene			Bi-Phenyl				
	Slurry, mg/kg:	2	Less Than	Di i nongi				
	Gas Phase, mg:	-	LCGS THAI					
	Dewar, mg:							
	Slurry, mg	1 178		slurry mo	ı. tbd			
	Total, mg:	1.18E+00			1		Run time:	8 Hours
					_		Run time: Run Temp: H2O2 vol:	86.5 deg C
	PCE, DRE, %	98.43%		BP, DRE, %	#VALUE!		H2O2 Vol	500 mi
	1,1,1-TriChloroEthane			Aroclor 1260				
		_	Less Than	Arocior 1260				
			Less man					
	Slurry, mg/kg:	2						
	Slurry, mg/kg: Gas Phase, mg:	2						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg:			Shirry me				
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg:	1.178		slurry ,m;	j:			
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg:	1.178 1.18E+00						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg:	1.178		slurry ,mş Aroclor, DRE, %	#VALUE!			
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, %	1.178 1.18E+00						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg:	1.178 1.18E+00						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, %	1.178 1.18E+00						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP	1.178 1.18E+00 98.74%						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, %	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP	1.178 1.18E+00 98.74%						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg:  TCA, DRE, %  BEHP  Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg:  TCA, DRE, %  BEHP  Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg:	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg: BEHP, DRE, %	1.178 1.18E+00 98.74% TBD						
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg: BEHP. DRE. %	1.178 1.18E+00 98.74% TBD tbd		Arocior, DRE, %	#VALUE!	ing the way		
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg: BEHP. DRE. %	1.178 1.18E+00 98.74% TBD tbd			#VALUE!	ing the run	s through run F-6.	
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg: BEHP. DRE. %	1.178 1.18E+00 98.74% TBD tbd		Arocior, DRE, %	#VALUE!	ing the run	s through run F-6.	
	Slurry, mg/kg: Gas Phase, mg: Dewar, mg: Slurry, mg: Total, mg: TCA, DRE, % BEHP Slurry, mg: BEHP. DRE. %	1.178 1.18E+00 98.74% TBD tbd		Arocior, DRE, %	#VALUE1		s through run F-6.	

Kujawa			Heat Balance				
7/28/2003 ST RUN	F-8						
SI KUN	Γ-8						
	Condenser Bath		Oil Bath				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
			2 22 11 11 11				
Time			Boss DS oil density, gm/ml	0.873 0.4			
			Boss DS oil heat cap. cal/gm/deg C	0.4			
10.30	Water Return Temp, Deg F	48	Oil Return Temp, Deg C	80.9			
10.50	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	16.75	Bucket ck time, sec	9.53			
	Flow rate, ml/min	358	Flow rate, ml/min	630			
	Enthalpy change, calorie/min:	1393	Enthalpy change, calorie/min:	-4199			
	Flask Top Surface Temp., F	168	Flask bottom Surface Temp., F	168			
	Air Temp. ,F	78 2.75	Air Temp. ,F Overall HT coef.	78 3			
	Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1357	Convective Loss, cal/min	2087			
	Radiative Loss, cal/min	634	Radiative Loss, cal/min	893			
	Flask top Heat Loss, cal/min	1991	Flask bottom Heat Loss, cal/min	2980	4971		
	Reactor Temperature, C	87.6	P1 Gas Temp. Deg C.	31		Correlated league Imain	4176
	Peroxide Temperature, F	78	Gas Flow Rate, gm/min	0.477		Correlated losses, cal/min	4176 819
	Peroxide Flow Rate, ml/min	0.8	Water Vap. gm/min P1 loss, H2O vapor, cal/min	0.0140 7.76		Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	-915
	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min	119.1	i i ioss, rizo vapor, cai/min	1.16		TO VISED ACCORDING BUILDIN, CAMITIMIT	J10
	r croxide Eminarpy Change, carmin	113.1					
			Accumulation/Generation, cal/min	-2291			
13:25	Water Return Temp, Deg F	47.7	Oil Return Temp, Deg C	80.9			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	16.75	Bucket ck time, sec	9.53 630			
	Flow rate, ml/min Enthalpy change, calorie/min:	358 1333	Flow rate, ml/min Enthalpy change, calorie/min:	-4199			
	Entrapy change, calonemin.	1555	Entitalpy change, calone/min.	-4133			
		Г		Γ_			
	Flask Top Surface Temp., F	170	Flask bottom Surface Temp., F	170			
	Air Temp. ,F	93	Air Temp. ,F	93			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94		-	
	Convective Loss, cal/min	1267 565	Convective Loss, cal/min Radiative Loss, cal/min	1785 797			
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	1832	Flask bottom Heat Loss, cal/min	2582	4414		
	Plask top Fleat Loss, cai/fillif	1002	Hask Bottom Heat Loss, Camini	1 2002			
	Reactor Temperature, C	89	P1 Gas Temp. Deg C.	31			
	Peroxide Temperature, F	93	Gas Flow Rate, gm/min	0.487		Correlated losses, cal/min	4176
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0140		Reflux Gas Delta H, cal/min	836
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	7.76		Revised Acc/generation, cal/min	-918
	Peroxide Enthalpy Change, cal/m	105.8					
			Accumulation/Generation, cal/min	-1662			
			, scamalation/ocheration, cal/milli	1002			
							-
			010 / 7				
15:25	Water Return Temp, Deg F	49.3	Oil Return Temp, Deg C	79.7			
	bucket ck volume, ml	100 16.75	bucket ck time, sec	9.59			
	Bucket ck time, sec Flow rate, ml/min		Bucket ck time, sec Flow rate, ml/min				
	Enthalpy change, calorie/min:	1652	Enthalpy change, calorie/min:	-4435			
				Τ			
	Flask Top Surface Temp., F	169	Flask bottom Surface Temp., F	169			
	Air Temp. ,F	91	Air Temp. ,F	91			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2_	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94 1809			
	Convective Loss, cal/min Radiative Loss, cal/min	1283 568	Convective Loss, cal/min Radiative Loss, cal/min	801			
		1851	Flask bottom Heat Loss, cal/min	2610	4461		
		1001	, rask pottom ricat 2005, carried	2010	1751		
	Flask top Heat Loss, cal/min	1	The state of the s				
		85.9	P1 Gas Temp. Deg C.	31			
	Reactor Temperature, C Peroxide Temperature, F	<b>85.9</b> 91	P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	0.016		Correlated losses, cal/min	4176
	Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	91	Gas Flow Rate, gm/min Water Vap. gm/min	0.016 0.0143		Reflux Gas Delta H, cal/min	27
	Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	91 0 0.8	Gas Flow Rate, gm/min	0.016			
	Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	91	Gas Flow Rate, gm/min Water Vap. gm/min	0.016 0.0143		Reflux Gas Delta H, cal/min	27
	Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	91 0 0.8	Gas Flow Rate, gm/min Water Vap. gm/min	0.016 0.0143		Reflux Gas Delta H, cal/min	27

S Kujawa									
7/30/2003				Re	eactor Charge	:			
					_				
TEST RUN	F-9A								
			SURROGATE		Target			Actual	
Component			CONTROCATE	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Component	Charge:			150	William	WIICIOL	Olama	Milling	WIICIOL
	Charge.			130					
				120.0442	120.04		400.004		
water				2.0938	2.38		120.094		
hydraulic oil							2.082		
cutting oil				2.0938	2.38		2.163		
IsoOctane							none		
Al2O3		1		0.3349	0.08	83.9	0.3350		
CaO				0.5413	0.16	163.0	0.5408		
Cr2O3		1		0.2326	0.04	44.6	0.2331		
Fe2O3				1.3032	0.44	435.1	1.3030		
MgO				0.7269	0.38	375.9	0.7275		
MnO				0.4254	0.08	82.1	0.4249		
SiO2				8.3907	3.71	3712.7	8.3908		
Na3PO4				12.2584	4.83	4831.8	12.2583		
KOH				0.3224	0.16	157.8	0.3230		
Hg				0.0516	0.00	3.8	0.0514		4
Aroclor-1260		Number of	Vials:				none		
TCE				0.8431	0.58	577.5	0.8595		580
PCE				0.0747	0.05	45.8	0.0748		46
TCA				0.0941	0.07	70.2	0.0981		70
BEHP				0.1619	0.17	165.2	0.1633		170
	Total:			150.0	135.55		150.1		
			REAGENTS						
Component				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
		1							
нсв				0.0056			0.0058		
BP				0.0029			0.0030		
ļ				0.0020			3.3000		
FeSO4 7H2O				1.5			1.5007		
1 0004 /1120		+		1.5			1.3007		
H2O2 (50%)		+		600	500		600	500	
11202 (3076)				300	300		600	500	
H2604 (20°2)		1					13.068		
H2SO4 (con)		1					13.068		
NI-OLL (4 NG		1					7 474		
NaOH (4 M)							7.678		
	<b>T</b>	-		75					
	Total:			751.5			772		
	1	1	1	1					ı

	S Kujawa													
	7/29/2003				Gas	Phase								
						a/Calculation	ons							
	TEST RUN	F-9A												
	Results		Gas Phase	Calculatio	ns									
Run Time	Gas Vol, cc	Time, sec	accm	Temp, F	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum		Rctr T
					psia		lb/ft^3	0	min.	gm/min	gm	gm		Deg C
9:45		1	0		12.08	31.3	0.066	0.000		0.000	0.000			81.6
9:50		1	170		12.08	31.3	0.066	0.179	5.0	0.089	0.447	0.4		81.3
10:00	0	1	339	76	12.16	31.3	0.066	0.360	10.0	0.269	2.692	3.1		85
10:15		8.84	339	76	12.16	31.3	0.066	0.360	15.0	0.360	5.398	8.5		88.6
10:30	50	8.78	342	76	12.16	31.3	0.066	0.363	15.0	0.361	5.420	14.0		87.8
10:45		8.94	336	76	12.16	31.3	0.066	0.356	15.0	0.359	5.390	19.3		87.7
11:00	50	8.75	343	78	12.16	31.3	0.066	0.362	15.0	0.359	5.389	24.7		87.2
11:15		8.28	362	78	12.16	31.3	0.066	0.383	15.0	0.373	5.591	30.3		87.5
11:30	50	7.97	376	79	12.16	31.3	0.066	0.397	15.0	0.390	5.851	36.2		87.8
11:45	50	7.18	418	80	12.16	31.3	0.066	0.440	15.0	0.419	6.279	42.5		88.3
12:00	50	6.94	432	80	12.16	31.3	0.066	0.455	15.0	0.448	6.715	49.2		88.7
12:15	50	6.59	455	81	12.16	31.3	0.066	0.479	15.0	0.467	7.004	56.2		89.1
12:30	50	6.09	493	82	12.16	31.3	0.065	0.517	15.0	0.498	7.466	63.6		89.5
12:45	50	6.35	472	82	12.16	31.3	0.065	0.496	15.0	0.506	7.595	71.2		89.3
13:00	50	6.16	487	83	12.16	31.3	0.065	0.510	15.0	0.503	7.544	78.8		89.5
13:15		5.78	519	84	12.16	31.3	0.065	0.543	15.0	0.526	7.895	86.7		89.6
13:30	50	6.06	495	84	12.16	31.3	0.065	0.518	15.0	0.530	7.951	94.6		89.4
13:45	50	5.88	510		12.16	31.3	0.065	0.533	15.0	0.525	7.882	102.5		89.4
14:00		6.41	468	85	12.16	31.3	0.065	0.488	15.0	0.511	7.663	110.2		89.8
14:15		7.53	398	86	12.16	31.3	0.065	0.415	15.0	0.452	6.775	116.9		89.3
14:30	50	9.31	322	85	12.16	31.3	0.065	0.336	15.0	0.376	5.634	122.6		88.8
14:45	50	10.88	276	85	12.16	31.3	0.065	0.288	15.0	0.312	4.680	127.3		88.3
15:00		12.78	235	86	12.16	31.3	0.065	0.245	15.0	0.266	3.992	131.3		87.7
15:15	50	14.56	206	86	12.16	31.3	0.065	0.215	15.0	0.230	3.443	134.7		87.4
15:30		17.82	168	86	12.16	31.3	0.065	0.175	15.0	0.195	2.925	137.6		86.8
15:45 16:00	50 50	22.71 32.2	132 93	86	12.16 12.16	31.3	0.065 0.065	0.138 0.097	15.0	0.156	2.347 1.760	140.0		86.3 85.9
16:00		32.2	93	86 86	12.16	31.3 31.3	0.065	0.007	15.0 15.0	0.117 0.049	0.728	141.7 142.5		85.9 85.3
16:30	0	1	0		12.16	31.3	0.065	0.000	15.0	0.049	0.728	142.5		84.6
	0			86				0.000						
16:45 17:00	5 0		41 0		12.16 12.16	31.3 31.3	0.065 0.065	0.043	15.0 15.0	0.022 0.022	0.323 0.323	142.8 143.1		84.4 83.9
17:15 17:30	0	1	0		12.16	31.3 31.3	0.065 0.065	0.000	15.0	0.000	0.000			83.5 83.1
		1	-		12.16				15.0	0.000	0.000	143.1		
17:45	0	1	0	87	12.16	31.3	0.065	0.000	15.0	0.000	0.000	143.1		82.9
							A	0.005	400.0			420.0	A	00.0
							Avg's:	0.285	480.0			136.8	Avg:	86.9
														I

S Kujawa									
7/30/2003				Test Results	Str RPM:	420	Start		
113012003				Test Results	SU KEWI.	420	Start		
TEST RUN	F-9A								
IESTRUN									
	Results								
	Product slurry Sp. Gr.:	1.03							
	Final Product Slurry, ml:	600							
	Final Product Slurry, gm:	618.1							
	Dewar Flask net wt., gm	1.0353							
	Liquid/slurry Product, gm:	619.1		(Slurry Wt, 100% H2O2/O2 RXN):	631				
	, g			()					
	Product Gas Weight, gm:	143.1		Gas Results are "Somewhat" dum	my number	e nondina	analvese		
	r rodact das vicigint, gin.	140.1			iniy namber	s pending	l lary ses		
	Product Wt, gm:	762.2							
	Product Wt, giii:	102.2						-	
	T / 101 W : 1/	770							
	Total Charge Weight, gm:	772							
	Overall Mass Balance								
	Mass Balance Closure:	98.7%							
	Mass balance w/o gas:	80%							
	, and the second		Ì						
	Species Mass Results			Species Mass Results					
	Opecies mass results			Opecies inass results					
	Tui Chiana Etha dana		Anal anda	HexachloroBenzene	NOTE	Anal. code			
	TriChloroEthylene	4.000							
	Slurry analysis, 1, mg/kg:	1.890		Slurry analysis, 1, mg/kg:	4.420				
	Slurry analysis, 2, mg/kg:	1.930		Slurry analysis, 2, mg/kg:		U			
	Avg., mg/kg			Avg., mg/kg					
	Total, mg:	1.181		Total, mg:	2.729				
	TCE, DRE, %	99.86%		HCB, DRE, %	52.95%				
					1				
	TetraChloroEthylene			Bi-Phenyl	NOTE				
	Slurry analysis, 1, mg/kg:	1.890	11	Slurry analysis, 1, mg/kg:		П			
	Slurry analysis, 1, mg/kg:	1.930		Slurry analysis, 1, mg/kg:	4.410				
						U			
	Avg., mg/kg	1.910		Avg., mg/kg					
	Total, mg:	1.181		Total, mg:	2.729				
	PCE, DRE, %	98.42%		BP, DRE, %	9.04%		Run time:		Hours
							Run Temp:	86.9	deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol:	500	ml
	Slurry analysis, 1, mg/kg:	1.890	U	Slurry analysis, 1, mg/kg:	0.000				
	Slurry analysis, 2, mg/kg:	1.930		Slurry analysis, 2, mg/kg:					
	Avg., mg/kg			Avg., mg/kg					
	Total, mg:	1.181		Total, mg:	0.000				
	rotal, my.	1.101		rotal, mg.	0.000				
	TCA DDE N	98.80%		Arealar DDC 0/	#VALUE!				
	TCA, DRE, %	90.00%		Aroclor, DRE, %	#VALUE!			-	
	BEHP	NOTE							
	Slurry analysis, 1, mg/kg:	26.400							
	Slurry analysis, 2, mg/kg:	20.600							
	Avg., mg/kg	23.500							
	Total, mg:	14.525							
	,								
	BEHP, DRE, %	91.11%							1
		₩ 0.11.70		1	1		1		1
	8/8/2003:								

ujawa Zugovogo			Heat Balance				
7/30/2003 <b>FRUN</b>	F-9A			numbers in	red are nue	l estionable	
LINON	r-sa			110111111111111111111111111111111111111	rou are que	Sucriditie.	
	Condenser Bath		Oil Bath				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
Time			Boss DS oil density, gm/ml	0.873			
			Boss DS oil heat cap. cal/gm/deg C	0.4			
11:32	Water Return Temp, Deg C	8.2	Oil Return Temp, Deg C	76.4			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	17.97	Bucket ck time, sec	9.94			
	Flow rate, ml/min		Flow rate, ml/min	604			
	Enthalpy change, calorie/min:	1068	Enthalpy change, calorie/min:	-4975			
		70.0	5	70.0			
	Flask Top Surface Temp., C	73.6	Flask bottom Surface Temp., C	79.3			
	Flask Top Surface Temp., F	164	Flask bottom Surface Temp., F	175			
	Air Temp. ,F	<b>79</b> 2.75	Air Temp. ,F	<b>79</b> 2.75			
	Overall HT coef. Btu/hr/F/sq ft		Overall HT coef.				
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1289	Convective Loss, cal/min	2035			
	Radiative Loss, cal/min	598	Radiative Loss, cal/min	970			
	Flask top Heat Loss, cal/min	1887	Flask bottom Heat Loss, cal/min	3005	4891		
	Decetor Terrort C	07.0	D4 Con Town Day C				
	Reactor Temperature, C	87.8	P1 Gas Temp. Deg C.	27		Completed leases	4440
	Peroxide Temperature, F	79	Gas Flow Rate, gm/min	0.390		Correlated losses, cal/min	4442
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0115		Reflux Gas Delta H, cal/min	670
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	6.39		Revised Acc/generation, cal/min	-255
	Peroxide Enthalpy Change, cal/min	118.4					
			Accumulation/Consention addition	4440			
			Accumulation/Generation, cal/min	-1110			
12.51	Water Return Temp, Deg C	8.2	Oil Return Temp, Deg C	77.7			
12.51	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	17.72	Bucket ck volume, mi	10.09			
	Flow rate, ml/min		Flow rate, ml/min	595			
		1084		-4631			
	Enthalpy change, calorie/min:	1064	Enthalpy change, calorie/min:	-4031			
	Flack Ton Surface Town C	74.6	Flack bottom Surface Tomp, C	79.9			
	Flask Top Surface Temp., C		Flask bottom Surface Temp., C	176			
	Flask Top Surface Temp., F	166	Flask bottom Surface Temp., F				
	Air Temp. ,F	<b>83</b>	Air Temp. ,F	<b>83</b>			
	Overall HT coef. Btu/hr/F/sq ft	188	Overall HT coef.				
	Top flask Area, in^2	0.94	bottom flask Area, in^2	265 0.94			
	emisivity	1370	emisivity	2152			
	Convective Loss, cal/min Radiative Loss, cal/min	591	Convective Loss, cal/min Radiative Loss, cal/min	952			
	Flask top Heat Loss, cal/min	1961	Flask bottom Heat Loss, cal/min	3104	5065		
	riask top rieat Loss, califfili	1901	Flask Dottom Heat Loss, Cal/min	3104	3003		
	Reactor Temperature, C	89.5	P1 Gas Temp. Deg C.	29			
	Peroxide Temperature, F	83	Gas Flow Rate, gm/min	0.503		Correlated losses, cal/min	4309
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0148		Reflux Gas Delta H, cal/min	863
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	8.24		Revised Acc/generation, cal/min	-659
	Peroxide Enthalpy Change, cal/min	117.4	. 11000, 1120 vapor, camini	0.24		. tensed Adageneration, califfilm	333
	. S. S. S. GO Emmany Orlange, cal/min	116.7					
			Accumulation/Generation, cal/min	-1644			
			01.0				
15:05	Water Return Temp, Deg C	8.2	Oil Return Temp, Deg C	78			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	17.44	Bucket ck time, sec	10.06			
	Flow rate, ml/min		Flow rate, ml/min	596			
	Enthalpy change, calorie/min:	1101	Enthalpy change, calorie/min:	-4582			
				00.4			
	Flack Ton Surface Temp C	75.0	Flack hottom Surface Temp C		l .		1
	Flask Top Surface Temp., C	75.6 168	Flask bottom Surface Temp., C	<b>80.4</b>			
	Flask Top Surface Temp., F	168	Flask bottom Surface Temp., F	177			
	Flask Top Surface Temp., F Air Temp. ,F	168 <b>86</b>	Flask bottom Surface Temp., F Air Temp. ,F	177 <b>86</b>			
	Flask Top Surface Temp., F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft	168 <b>86</b> 3	Flask bottom Surface Temp., F Air Temp. ,F Overall HT coef.	177 <b>86</b> 3			
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	168 <b>86</b> 3 188	Flask bottom Surface Temp., F Air Temp. ,F Overall HT coef. bottom flask Area, in^2	177 <b>86</b> 3 265			
	Flask Top Surface Temp., F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity	168 <b>86</b> 3 188 0.94	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity	177 <b>86</b> 3 265 0.94			
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	168 86 3 188 0.94 1350	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	177 <b>86</b> 3 265 0.94 2104			
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Radiative Loss, cal/min	168 86 3 188 0.94 1350 589	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	177 <b>86</b> 3 265 0.94 2104 939			
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	168 86 3 188 0.94 1350	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	177 <b>86</b> 3 265 0.94 2104			
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	168 86 3 188 0.94 1350 589 1940	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	177 86 3 265 0.94 2104 939 3043	4983		
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C	168 86 3 188 0.94 1350 589 1940	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C.	177 86 3 265 0.94 2104 939 3043	4983		1112
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F	168 86 3 188 0.94 1350 589 1940	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	177 86 3 265 0.94 2104 939 3043 31.5	4983	Correlated losses, cal/min	4143
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	168 86 3 188 0.94 1350 589 1940 87.7 86	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	177 86 3 265 0.94 2104 939 3043 31.5 0.498 0.2296	4983	Correlated losses, cal/min Reflux Gas Delta H, cal/min	855
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	168 86 3 188 0.94 1350 589 1940 87.7 86 0	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	177 86 3 265 0.94 2104 939 3043 31.5	4983	Correlated losses, cal/min	
	Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	168 86 3 188 0.94 1350 589 1940 87.7 86	Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	177 86 3 265 0.94 2104 939 3043 31.5 0.498 0.2296	4983	Correlated losses, cal/min Reflux Gas Delta H, cal/min	855

S Kujawa	F-9A					
7/30/2003						
17:23	Water Return Temp, Deg C	8.9	Oil Return Temp, Deg C	77.7		
	bucket ck volume, ml	100	bucket ck volume, ml	100		
	Bucket ck time, sec	18.06	Bucket ck time, sec	9.75		
	Flow rate, ml/min	332	Flow rate, ml/min	615		
	Enthalpy change, calorie/min:	1296	Enthalpy change, calorie/min:	-4792		
	Flask Top Surface Temp., C	70.4	Flask bottom Surface Temp., C	79.4		
	Flask Top Surface Temp., F	159	Flask bottom Surface Temp., F	175		
	Air Temp. ,F	87	Air Temp. ,F	87		
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3		
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	1180	Convective Loss, cal/min	2039		
	Radiative Loss, cal/min	503	Radiative Loss, cal/min	908		
	Flask top Heat Loss, cal/min	1683	Flask bottom Heat Loss, cal/min	2947	4630	
	Reactor Temperature, C	83.1	P1 Gas Temp. Deg C.	31		
	Peroxide Temperature, F	87	Gas Flow Rate, gm/min	0.530	Correlated losses, cal/min	4176
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0000	Reflux Gas Delta H, cal/min	910
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.00	Revised Acc/generation, cal/min	-294
	Peroxide Enthalpy Change, cal/min	0.0				
			Accumulation/Generation, cal/min	-1134		

S Kujawa				401				
8/5/2003	3		Re	actor Char	ge			
TEST RUN	F-10							
TEOT NON	1-10	SURROGATE		Target			Actual	
Component		SORROGATE	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Component	Charge:		150		WICIOL	Oranis	Willing 13	MICIOL
	Charge.		150					
water			120.0442	120.04		120.615		
hydraulic oil			2.0938	2.38		1.921		
cutting oil			2.0938	2.38		2.104		
Al2O3			0.3349	0.08	83.9	0.334		
CaO			0.5413		163.0	0.541		
Cr2O3			0.2326		44.6	0.233		
Fe2O3			1.3032		435.1	1.304		
MgO			0.7269		375.9	0.726		
MnO			0.4254		82.1	0.425		
SiO2			8.3907	3.71	3712.7	8.390		
Na3PO4			12.2584		4831.8	12.259		
KOH			0.3224		157.8	0.321		
Hg			0.0516		3.8	0.0554		- 4
Aroclor-1260						none		
TCE			0.8431	0.58	577.5	0.8529	TCE	580
PCE			0.0747		45.8	0.0747	PCE	46
TCA			0.0941	0.07	70.2	0.0957	TCA	70
BEHP			0.1619		165.2	0.1731	BEHP	170
	Total:		150.0	135.55		150.4		
		REAGENTS						
Component		112.102.11.10	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
HCB			0.0056			0.006	HCB	
BP			0.0029			0.003	BP	
FeSO4 7H2O			1.5			1.498		
11000 (500()			400	400		400	400	
H2O2 (50%)			480	400		480	400	
H2SO4 (con)						11.9441		
NaOH (4 M)						3.549		
	Total:		631.5			647		

	S Kujawa												
	8/5/2003				Gas	Phase	$\neg$						
	0/0/2000					a/Calculatio	ns 🗀						
	TEST RUN	F-10											
	TEOT NON												
	Results	<del>                                     </del>	Gas Phase	Calculatio	ns								-
Run Time	Gas Vol, cc	Time, sec	accm	Temp, C	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum	Rctr T
		, , , , , , , , , , , , , , , , , , , ,		1.	psia		lb/ft^3	0	min.	gm/min	gm	gm	Deg C
9:00	0	1	0	20.5	12.07	31.3	0.067	0.000		0.000	0.000	0.0	8
9:05	0	1	0	20.5	12.07	31.3	0.067	0.000	5.0	0.000	0.000	0.0	84.
9:15	50	7.69	390	20.5	12.07	31.3	0.067	0.417	10.0	0.208	2.084	2.1	90.
9:30	50	7.16	419	20.5	12.07	31.3	0.067	0.448	15.0	0.432	6.484	8.6	91.
9:45	50	6.94	432	21	12.07	31.3	0.067	0.461	15.0	0.454	6.816		92.
10:00	50	6.97	430	22	12.07	31.3	0.066	0.458	15.0	0.459	6.890	22.3	92.
10:15	50	9.5	316	23	12.07	31.3	0.066	0.335	15.0	0.396	5.946	28.2	92.
10:30	50		360	23	12.07	31.3	0.066	0.381	15.0	0.358	5.372	33.6	91.
10:45	50		366	23	12.07	31.3	0.066	0.388	15.0	0.385	5.769	39.4	9
11:00			385	23	12.07	31.3	0.066	0.408	15.0	0.398	5.971	45.3	92.
11:15			391	24	12.07	31.3	0.066	0.413	15.0	0.411	6.159		92
11:30			419		12.07	31.3	0.066	0.441	15.0	0.427	6.406		92.
11:45			420		12.07	31.3	0.066	0.442	15.0	0.441	6.619		92.
12:00			407	25	12.07	31.3	0.066	0.428	15.0	0.435	6.520		93.
12:15			435		12.07	31.3	0.066	0.458	15.0	0.443	6.640		93.
12:30			414	25	12.07	31.3	0.066	0.435	15.0	0.447	6.698		
12:45			343		12.07	31.3	0.066	0.360	15.0	0.398	5.968		93. 92.
13:00			278		12.07	31.3	0.065	0.291	15.0	0.326	4.885		92.
13:15			225		12.07	31.3	0.065	0.235	15.0	0.263	3.946	102.3	91.
13:30			179		12.07	31.3	0.065	0.187	15.0	0.211	3.167		91.
13:45			152		12.07	31.3	0.065	0.159	15.0	0.173	2.595		89.
14:00			102		12.07	31.3	0.065	0.107	15.0	0.133 0.096	1.992 1.440		88.
14:15			82		12.07	31.3	0.065	0.085	15.0 15.0	0.096	1.440		88.
14:30			68		12.07	31.3	0.065	0.070 0.063	15.0	0.078	0.998		87.
14:45			61		12.07	31.3 31.3	0.065 0.065	0.063	15.0	0.056	0.844		87
15:00					12.07	31.3	0.065	0.050	15.0	0.038	0.720		86
15:15					12.07	31.3	0.065	0.046	15.0	0.040	0.600		86
15:30					12.07 12.07	31.3	0.065	0.034	15.0	0.040	0.469		86.
15:45					12.07	31.3	0.065	0.029	15.0	0.031	0.353		85.
16:00 16:15					12.07	31.3	0.065	0.020	15.0	0.019	0.284		85.
					12.07	31.3	0.065	0.020	15.0	0.018	0.265		85.
16:30					12.07	31.3	0.065	0.010	15.0	0.013	0.200		85.
16:45 17:00					12.07	31.3	0.065	0.010		0.010			85
17:00					12.07	31.3	0.065			0.015	0.075		84
17:15					12.07	31.3	0.065	0.000		0.000			84
17:30					12.07	31.3	0.065	0.000		0.000			84
18:00					12.07	31.3	0.065			0.000			84
18:15			-		12.07	31.3	0.065			0.000	0.000	114.5	-
18:30					12.07	31.3	0.065			0.000			86
18:45						1				0.000	0.000		86
19:00			_							0.000			86
19:15						31.3	0.065			0.000	0.000	114.5	86
19:30										0.000			86
19:45										0.000		114.5	86
20:00							0.065			0.000	0.000		86
20:00		1								0.000	0.000	114.5	86
20:30										0.000			86
20:45		4								0.000	0.000		86
21:00		4					0.065	0.000	15.0	0.000	0.000	114.5	86
	`	·	†										
		<del>                                     </del>					Avg's:	0.154	720.0			110.9 Avg:	88
L	+			+			Ŭ.						- T

Kujawa				Trad Brands					
8/5/2003				Test Results	Str RPM:	456	Start		
STRUN	F-10								
	Results								
	Product slurry Sp. Gr.:	1.04							
	Final Product Slurry, ml:	505							
	Final Product Slurry, gm:	525.9							
	Dewar Flask net wt., gm	0.6207							
	Liquid/slurry Product, gm:	526.5		(Slurry Wt, 100% H2O2/O2 RXN):	534				
	Product Gas Weight, gm:	114.5		Gas Results are "Somewhat" dun	nmy numbe	ers pending	analyses		
		211.0							
	Product Wt, gm:	641.0							
	Total Charge Weight, gm:	647							
	Overall Mass Balance	AA A							
	Mass Balance Closure:	99.0%							
	Maga balanga wife area								
	Mass balance w/o gas:	81%							
	Species Mass Results			Species Mass Results					
	Tiolis			III.					
	TriChloroEthylene	4.050		HexachloroBenzene	4.000	Anal. code			
	Slurry analysis, 1, mg/kg:	1.950		Slurry analysis, 1, mg/kg:		U-RE			
	Slurry analysis, 2, mg/kg:	1.960		Slurry analysis, 2, mg/kg:	0.868				
	Avg., mg/kg			Avg., mg/kg					
	Total, mg:	1.028		Total, mg:	1.540				
	TOE DDE 0			LIGHT BRE AV					
	TCE, DRE, %	99.88%	-	HCB, DRE, %	74.33%				
	T-4-0-1			Di Dhamid					
	TetraChloroEthylene	1.950		Bi-Phenyl	1.000	U-RE			
	Slurry analysis, 1, mg/kg:			Slurry analysis, 1, mg/kg:					
	Slurry analysis, 2, mg/kg:	1.960		Slurry analysis, 2, mg/kg:		U-RE			
	Avg., mg/kg			Avg., mg/kg					
	Total, mg:	1.028		Total, mg:	2.556				
	PCE, DRE, %	98.62%		BP, DRE, %	44.000/				Hours
	PCE, DRE, %	98.62%		BP, DRE, %	14.80%		Run time:		
	1117:01 50						Run Temp:		deg C
	1,1,1-TriChloroEthane	1.950		Aroclor 1260	0.000		H2O2 vol:	400	mı
	Slurry analysis, 1, mg/kg:	1.950		Slurry analysis, 1, mg/kg:	0.000				
	Slurry analysis, 2, mg/kg:			Slurry analysis, 2, mg/kg:	0.000				
	Avg., mg/kg	1.955		Avg., mg/kg	0.000				
	Total, mg:	1.028		Total, mg:	0.000				
	TOA DDE 0	00.000		A					
	TCA, DRE, %	98.93%		Aroclor, DRE, %	#VALUE!				
	DELID								
	BEHP	20.522	DE						
	Slurry analysis, 1, mg/kg:	28.500							
	Slurry analysis, 2, mg/kg:	56.500							
	Avg., mg/kg								
	Total, mg:	22.351							
	BELLD DDE 0/	97.0004							
	BEHP, DRE, %	87.09%							
	I						1		
	0.00.0000								
	8/8/2003:	1	1		1	1			l

ujawa 9/16/2003			Heat Balance			+
9/16/2003 ST RUN	F-10					+ +
I KUN	F-10			r	numbers in red are questionable.	+
	Condenser Bath		Oil Bath	i i	lambers in rea are questionable.	
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100		
Time			Boss DS oil density, gm/ml	0.873		
			Boss DS oil heat cap. cal/gm/deg C	0.4		
9:39	Water Return Temp, Deg C	7.6	Oil Return Temp, Deg C	78.8		
	bucket ck volume, ml	100	bucket ck volume, ml	100		
	Bucket ck time, sec	16.72	Bucket ck time, sec	10.13		
	Flow rate, ml/min	359	Flow rate, ml/min	592		
	Enthalpy change, calorie/min:	933	Enthalpy change, calorie/min:	-4385		
	Floor Ton Curtosa Tomp C	74.4	Flack bettem Surface Temp C	70.0		
	Flask Top Surface Temp., C Flask Top Surface Temp., F	<b>74.1</b> 165	Flask bottom Surface Temp., C Flask bottom Surface Temp., F	<b>76.2</b> 169		
	Air Temp. ,F	73.4	Air Temp. ,F	73.4		
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall HT coef.	2.75		+
	Top flask Area, in^2	188	bottom flask Area, in^2	265		-
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	1387	Convective Loss, cal/min	2035		+
	Radiative Loss, cal/min	636	Radiative Loss, cal/min	943		
	Flask top Heat Loss, cal/min	2023	Flask bottom Heat Loss, cal/min	2978	5001	
			,			
	Reactor Temperature, C	92.3	P1 Gas Temp. Deg C.	23		
	Peroxide Temperature, F	73.4	Gas Flow Rate, gm/min	0.454	Correlated losses, cal/min	4708
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0134	Reflux Gas Delta H, cal/min	780
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	7.44	Revised Acc/generation, cal/min	-1236
	Peroxide Enthalpy Change, cal/r	133.1				
			Accumulation/Generation, cal/min	-1690		
10:32	Water Return Temp, Deg C	8.2	Oil Return Temp, Deg C	77.6		
	bucket ck volume, mI	100	bucket ck volume, ml	100		
	Bucket ck time, sec	17.09	Bucket ck time, sec	10.15		
	Flow rate, ml/min	351	Flow rate, ml/min	591 -4624		
	Enthalpy change, calorie/min:	1123	Enthalpy change, calorie/min:	-4624		
	Flask Top Surface Temp., C	74.4	Flask bottom Surface Temp., C	76.2		
	Flask Top Surface Temp., F	166	Flask bottom Surface Temp., F	169		+
	Air Temp. ,F	77	Air Temp. ,F	77		
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall HT coef.	2.75		+
	Top flask Area, in^2	188	bottom flask Area, in^2	265		
	emisivity	0.94	emisivity	0.94		
	Convective Loss, cal/min	1341	Convective Loss, cal/min	1959		
	Radiative Loss, cal/min	621	Radiative Loss, cal/min	915		
	Flask top Heat Loss, cal/min	1962	Flask bottom Heat Loss, cal/min	2874	4836	
	Reactor Temperature, C	91.6	P1 Gas Temp. Deg C.	23		
	Peroxide Temperature, F	77	Gas Flow Rate, gm/min	0.358	Correlated losses, cal/min	
						4708
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0106	Reflux Gas Delta H, cal/min	615
	Peroxide heat Cap, cal/gm/degC	0.8	Water Vap. gm/min P1 loss, H2O vapor, cal/min			
		0.8		0.0106	Reflux Gas Delta H, cal/min	615
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.0106 5.87	Reflux Gas Delta H, cal/min	615
	Peroxide heat Cap, cal/gm/degC	0.8		0.0106	Reflux Gas Delta H, cal/min	615
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.0106 5.87	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r	0.8 127.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min	0.0106 5.87 -1469	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C	0.8 127.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C	0.0106 5.87 -1469	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml	0.8 127.9 8.2 100	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml	0.0106 5.87 -1469 77.5 100	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	8.2 100 17.09	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	0.0106 5.87 -1469	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	8.2 100 17.09 351	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml	0.0106 5.87 -1469 77.5 100 9.53	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	8.2 100 17.09	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	0.0106 5.87 -1469 77.5 100 9.53 630	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	8.2 100 17.09 351	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	0.0106 5.87 -1469 77.5 100 9.53 630	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	8.2 100 17.09 351 1123	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	77.5 100 9.53 630 -4947	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F	8.2 100 17.09 351 1123 75.5 168 79	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F	77.5 100 9.53 630 -4947 76.9 170 79	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp, C Flask Top Surface Temp, F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft	8.2 100 17.09 351 1123 75.5 168 79 2.75	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef.	77.5 100 9.53 630 -4947 76.9 170 79 2.75	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp, C Flask Top Surface Temp, F Air Temp, F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	8.2 100 17.09 351 1123 76.5 168 79 2.75	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2	0.0106 5.87 -1469 77.5 100 9.53 630 -4947 76.9 170 79 2.75 2.25 2.25	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emiskity	8.2 100 17.09 17.09 17.09 1123 75.5 168 79 2.75 188 0.94	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emis/vity	0.0106 5.87 -1469 77.5 100 9.53 630 -4947 76.9 179 2.75 265 0.94	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	77.5 100 9.53 630 -4947 76.9 170 9.2.75 265 0.94	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	8.2 100 17.09 351 1123 76.5 168 79 2.75 188 0.94 1341 627	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	77.5 100 77.5 100 76.9 170 76.9 170 76.9 170 170 19 2.75 2.65 0.94 1943 915	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	77.5 100 9.53 630 -4947 76.9 170 9.2.75 265 0.94	Reflux Gas Delta H, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94 1341 627 1968	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	77.5 100 9.53 630 -4947 76.9 170 2.76 266 0.94 1943 915 2859	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94 1341 627 1968	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C.	77.5 100 77.5 9.53 630 -4947 76.9 170 79 2.75 265 0.94 1943 915	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp, C Flask Top Surface Temp, F Air Temp, F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F	8.2 100 17.09 351 1123 76.5 168 79 2.75 188 0.94 1341 627 1968	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	0.0106 5.87 77.5 100 9.53 630 4947 76.9 170 79 2.75 2.65 0.94 1943 915 2.859 2.869 0.441	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  4826  Correlated losses, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94 1341 627 1968	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	77.5 100 9.53 630 4947 76.9 179 2.75 265 0.94 1943 915 2859 26 0.441 0.0960	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  4826  Correlated losses, cal/min Reflux Gas Delta H, cal/min	615   #827   #827   4508   758
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94 1341 627 1968 93 79 2	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	0.0106 5.87 77.5 100 9.53 630 4947 76.9 170 79 2.75 2.65 0.94 1943 915 2.859 2.869 0.441	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  4826  Correlated losses, cal/min	615
11:41	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	8.2 100 17.09 351 1123 75.5 168 79 2.75 188 0.94 1341 627 1968	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	77.5 100 9.53 630 4947 76.9 179 2.75 265 0.94 1943 915 2859 26 0.441 0.0960	Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  4826  Correlated losses, cal/min Reflux Gas Delta H, cal/min	615   #827   #827   4508   758

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16/2003							
	Water Return Temp, Deg C bucket ck volume, ml	8.1 100	Oil Return Temp, Deg C bucket ck volume, ml	77.3 100			
	Bucket ck time, sec	16.91	Bucket ck time, sec	10.06			
	Flow rate, ml/min		Flow rate, ml/mir				
	Enthalpy change, calorie/min:	1100	Enthalpy change, calorie/min:	-4728			
	Flask Top Surface Temp., C	76.7	Flash battana Quefa a Tanan Q	70			
	Flask Top Surface Temp., F	75.7 168	Flask bottom Surface Temp., C Flask bottom Surface Temp., F	76 169			
	Air Temp. ,F	83	Air Temp. ,F	83			
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall HT coef.	2.75			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity Convective Loss, cal/min	0.94 1286	emisivity  Convective Loss, cal/min	0.94 1824			
	Radiative Loss, cal/min	608	Radiative Loss, cal/min	864			
	Flask top Heat Loss, cal/min	1894	Flask bottom Heat Loss, cal/min	2687	4581		
	Reactor Temperature, C Peroxide Temperature, F	93.8 83	P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	27.5 0.398		Correlated losses collmin	4409
	Peroxide Flow Rate, ml/min	0 0	Water Vap. gm/min	0.0176		Correlated losses, cal/min Reflux Gas Delta H, cal/min	683
	Peroxide heat Cap, cal/gm/degC		P1 loss, H2O vapor, cal/min	9.79		Revised Acc/generation, cal/min	-364
	Peroxide Enthalpy Change, cal/r	0.0					
			Accumulation/Generation, cal/min	-963			
	Water Return Temp, Deg C bucket ck volume, ml	8.9 100	Oil Return Temp, Deg C bucket ck volume, ml	79.1 100			
	Bucket ck time, sec	16.32	Bucket ck time, sec	10.12			
	Flow rate, ml/min	368	Flow rate, ml/mir	593			
	Enthalpy change, calorie/min:	1434	Enthalpy change, calorie/min:	-4327			
	Flask Top Surface Temp., C	75.6	Flask bottom Surface Temp., C	77.3			
	Flask Top Surface Temp., C	168	Flask bottom Surface Temp., C	17.3			
	Air Temp. ,F	85	Air Temp. ,F	85			
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall HT coef.	2.75			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity Convective Loss, cal/min	0.94 1253	emisivity Convective Loss, cal/min	0.94 1831			
	Radiative Loss, cal/min	595	Radiative Loss, cal/min	877			
	Flask top Heat Loss, cal/min	1848	Flask bottom Heat Loss, cal/min	2708	4556		
	Reactor Temperature, C	91.3	P1 Gas Temp. Deg C.	29.5			
	Peroxide Temperature, F	85	Gas Flow Rate, gm/min	0.173		Correlated losses, cal/min	4276
		0				Reflux Gas Delta H, cal/min	297
	Peroxide Flow Rate, ml/min		Water Vap. gm/min	0.0051			\$2000000000000000000000000000000000000
	Peroxide heat Cap, cal/gm/deg0	0.8	P1 loss, H2O vapor, cal/min	2,83		Revised Acc/generation, cal/min	-246
		0.8	P1 loss, H2O vapor, cal/min	2.83			-246
	Peroxide heat Cap, cal/gm/deg0	0.8					-246
	Peroxide heat Cap, cal/gm/deg0	0.8	P1 loss, H2O vapor, cal/min	2.83			-246
	Peroxide heat Cap, cal/gm/deg0	0.8	P1 loss, H2O vapor, cal/min	2.83			-246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml	0.8 0.0 8.7 100	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi	-1665 -78.8 100			-246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	8.7 100 16.46	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml  Bucket ck time, sec	78.8 100 10.74			+246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	8.7 100 16.46 365	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec  Flow rate, ml/mir	78.8 100 10.74 559			+246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	8.7 100 16.46	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml  Bucket ck time, sec	78.8 100 10.74			-246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	8.7 100 16.46 365 1349	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C	78.8 100 10.74 1 559 4136			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/f  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F	8.7 100 16.46 365 1349 71.5	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F	78.8 100 10.74 1 559 4136 76 169			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp, C Air Temp, F	8.7 100 16.46 365 1349 71.5 161 89	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F	78.8 100 10.74 559 4136 76 169 89			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft	8.7 100 16.46 365 1349 71.5 161 89 2.75	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef.	78.8 100 10.74 559 4136 76 169 89 2.75			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp, C Air Temp, F	8.7 100 16.46 365 1349 71.5 161 89	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F	78.8 100 10.74 559 4136 76 169 89			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	8.7 10.0 16.46 365 1348 71.5 161 89 2.75 188 0.94	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	8.77 100 16.46 365 1349 71.5 161 189 2.75 188 0.94 1081 508	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy chape, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emishvity Convective Loss, cal/min Radiative Loss, cal/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696 815			246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	8.7 10.0 16.46 365 1348 71.5 161 89 2.75 188 0.94	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696	4101		246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	8.7 100 16.46 365 1349 71.5 161 89 9.2.75 188 0.94 1081 508	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696 815	4101		246
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef, Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F	8.7 100 16.46 365 1349 71.5 161 188 0.94 1081 1590 86.7 88	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ok volume, mi Bucket ok time, sec  Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	78.8 100 10.74 1 559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5	4101		4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	8.7 100 16.46 365 1349 71.5 161 183 9.2.75 188 0.94 1081 508 1590 86.7 9.9	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy chalorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask pottom Heat Loss, cal/min Flask pottom Rate, gm/min Water Vap, gm/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696 815 2511	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	8.77 100 16.46 365 1349 71.5 161 161 188 0.94 1081 508 1590 86.7 89 0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ok volume, mi Bucket ok time, sec  Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	78.8 100 10.74 1 559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5	4101	Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	8.77 100 16.46 365 1349 71.5 161 161 188 0.94 1081 508 1590 86.7 89 0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy chalorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask pottom Heat Loss, cal/min Flask pottom Rate, gm/min Water Vap, gm/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696 815 2511	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	8.77 100 16.46 365 1349 71.5 161 161 188 0.94 1081 508 1590 86.7 89 0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy chalorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask pottom Heat Loss, cal/min Flask pottom Rate, gm/min Water Vap, gm/min	78.8 100 10.74 559 4136 76 169 89 2.75 265 0.94 1696 815 2511	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Temperature, F Peroxide Temperature, F Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Enthalpy Change, cal/r	8.7 100 16.46 365 1349 2.75 188 0.94 1001 1590 86.7 88.7 89 0.0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy chape, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emishvity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min	78.8 100 10.74 1559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C	8.7 100 16.46 365 1349 71.5 161 89 2.75 188 0.94 1081 508 1590 86.7 89 0.0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp, Deg C	78.8 100 10.74 1559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml	8.7 100 16.46 365 13.49 71.5 181 89 2.75 188 0.94 1081 508 1590 0 0 0.8 0.0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ok volume, mi Bucket ok time, sec  Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ok volume, mi	78.8 100 10.74 1559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C	8.77 100 16.46 365 1349 2.75 188 0.94 1081 508 1590 86.7 89 0 0 0 0 0 0 8.2 100 16.46	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp, Deg C	2,83  78.8  100 10.74 1559 4136  76 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66  -1314	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Te	8.77 100 16.46 365 1349 2.75 188 0.94 1081 508 1590 86.7 89 0 0 0 0 0 0 8.2 100 16.46	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorier/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec	2,83  78.8  100 10.74 1559 4136  76 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66  -1314	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperatur	8.77 100 16.46 365 1349 2.75 188 0.94 1081 508 1590 8.6.7 8.9 0 0 0.8 10.0	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorier/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:	2,83  78.8  100  10.74  559  4136  76  89  2.75  265  0.94  1696  815  2511  30.5  0.040  0.66	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Flask top Temperature, C Peroxide Flow Rate, ml/min Reactor Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck round reserved. Flow Rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C	8.77 100 16.46 365 1349 71.5 188 2.75 188 0.94 1081 508 1590 0 0 0 8.77 0 0 0 16.46 365 1166 69.8	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/mir  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min: Flask bottom Surface Temp., C	2,83  78.8  78.8  100  10,74  1,559  4136  76  169  89  2,75  265  0,94  1696  815  2511  30.5  0.040  0.0012  0.66  -1314  76.3  100  10,74  559  4623	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C	8.7 100 16.46 365 1349 2.75 188 0.94 1590 86.7 89 0.0 0.0 1590 1590 16.46 365 1166 365 1166	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorier/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:	2,83  78.8  100 10.74 1559 4136 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66  -1314  76.3 100 10.74 559 4623	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisvity Convective Loss, cal/min Flask top Temperature, C Peroxide Flow Rate, ml/min Reactor Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck round reserved. Flow Rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C	8.77 100 16.46 365 1349 71.5 188 2.75 188 0.94 1081 508 1590 0 0 0 8.77 0 0 0 16.46 365 1166 69.8	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min:  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emishity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., C	2,83  78.8  78.8  100  10,74  1,559  4136  76  169  89  2,75  265  0,94  1696  815  2511  30.5  0.040  0.0012  0.66  -1314  76.3  100  10,74  559  4623	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2	8.7 100 16.46 365 1349 2.75 188 0.94 1001 1590 86.7 89 0.0 0.0 1590 16.46 365 1166 166 365 1166	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min:  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emishvity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gn/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2	2,83  78.8 100 10.74 1559 4136 76 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^22 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Enthalpy change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity	8.7 100 16.46 365 1349 71.5 161 161 188 0.94 1081 508 86.7 89 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity	2,83  78.8  100  10.74  1559  4136  76  169  89  2.75  265  0.94  1696  815  2511  30.5  0.040  0.0012  0.66  -1314  76.3  100  10.74  559  4623  74.8  167  85  2.75  265  0.94	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy Change, calorie/min: Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min Flexic Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck rolume, ml Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	8.7 100 16.46 365 1349 71.5 188 0.94 1081 508 1590 0.8 1590 0.0 10.0 10.0 10.0 10.0 10.0 10.0 10.	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, mi Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall H7 coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, see Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall H7 coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	2,83  78.8  100  10,74  1559  4136  76  169  89  2,75  265  0,94  1696  815  2511  30.5  0.040  0.0012  0.66  -1314  76.3  100  10.74  1559  4623  74.8  167  85  2,75  265  0,94  1735	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	8.77 100 16.46 365 1349 2.75 188 0.94 1001 15.90 86.7 89 0.0 0.8 0.0 15.90 16.46 365 1166 89.8 1598 85 2.75 188 85 2.75 188 85 2.75	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	2,83  78.8  100  10.74  1559  4136  76  89  2.75  265  0.94  1696  815  2511  30.5  0.040  0.0012  0.66  -1314  76.3  76.3  100  10.74  1559  4623  74.8  74.8  167  85  2.75  2.65  0.94  1735  821		Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
16:42	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min	8.7 100 16.46 365 1349 2.75 188 0.94 1590 8.7 9.9 0.0 16.46 365 1590 8.7 9.9 0.9 1590 1590 16.46 365 1166 16.46 365 1166 16.46 365 1166 16.46 365 1166 16.46 365 16.46 365 16.46 365 16.46 365 365 365 365 365 365 365 365 365 36	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp, F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp, F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min	2,83  78.8  100 10.74 1559 4136 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66  -1314  76.3 100 10.74 559 4823 167 85 0.94 1735 821 2556	4101	Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Celta H, cal/min  Revised Acc/generation, cal/min	4209
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Reactor Temperature, C Flow rate, ml/min Flow rate, ml/min Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min	8.77 100 16.46 365 1349 2.75 188 0.94 1081 508 1590 86.7 89 0 0 16.46 365 1166 89.8 1590 10.00	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min	2,83  78.8  100  10.74  1559  4136  76  89  2.75  265  0.94  1696  815  2511  30.5  0.040  0.0012  0.66  1314  76.3  76.3  74.8  167  85  2.75  265  0.94  1735  265  0.94  1735  265  0.94  1735  265  277		Revised Acc/generation, cal/min  Correlated losses, cal/min  Reflux Gas Delta H, cal/min  Revised Acc/generation, cal/min	4209 69 1:142
16:42	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp,. C Flask Top Surface Temp,. F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck volume, ml Bucket ck volume, ml Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C	8.7 100 16.46 365 1349 71.5 161 89 2.75 188 0.94 1081 1590 86.7 89 0.0 0.0 16.46 365 1166 188 0.94 1081 1590 1590 1590 1590 1590 1590 1590 159	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min  Accumulation/Generation, cal/min P1 loss, H2O vapor, cal/min Coil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min	2,83  78.8  100  10,74  1559  4136  76  169  89  2,75  265  0,94  1696  815  2511  30.5  0,040  0,0012  0,66  -1314  76.3  100  10,74  559  4623  74.8  167  85  2,75  265  0,94  1735  821  275  0,94  1735		Revised Acc/generation, cal/min  Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  Times from 15:33 data	4209 69 1142
16:42	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Peroxide Temperature, C Peroxide Temperature, C Peroxide Temperature, C Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in/2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min Flask Top Heat Loss, cal/min Flask Top Heat Loss, cal/min Flask Top Heat Loss, cal/min	8.7 100 16.46 365 1349 2.75 188 0.94 1590 86.7 89 0.0 1590 16.46 365 1166 69.8 1590 16.46 365 1166 16.46 365 1166 16.46 365 1166 365 1166 365 1166 365 1166 365 1166 365 365 365 365 365 365 365 365 365 3	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emislvity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask Detom Rate, gm/min Water Vap, gm/min	2,83  78.8  100 10.74 1559 4136 169 89 2.75 265 0.94 1696 815 2511 30.5 0.040 0.0012 0.66  -1314  76.3 100 10.74 559 4623 74.8 167 85 0.94 1735 821 1735 821 2556		Revised Acc/generation, cal/min  Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  Times from 15:33 data  Correlated losses, cal/min Reflux Gas Delta H, cal/min	4209 69 142 4442 23
15:33	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp,. C Flask Top Surface Temp,. F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/r  Water Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck volume, ml Bucket ck volume, ml Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Temperature, C	8.77 100 16.46 365 1349 2.75 188 0.94 1081 508 1590 8.6.7 8.9 0 0 0.8 1590 8.6.7 8.9 10.0 16.46 365 1166 8.8 158 158 158 158 158 158 158 158 158 15	P1 loss, H2O vapor, cal/min  Accumulation/Generation, cal/min  Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir  Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap, gm/min  Accumulation/Generation, cal/min P1 loss, H2O vapor, cal/min Coil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/mir Enthalpy change, calorie/min:  Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min	2,83  78.8  100  10,74  1559  4136  76  169  89  2,75  265  0,94  1696  815  2511  30.5  0,040  0,0012  0,66  -1314  76.3  100  10,74  559  4623  74.8  167  85  2,75  265  0,94  1735  821  275  0,94  1735		Revised Acc/generation, cal/min  Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min  Times from 15:33 data	4209 69 1142

S Kujawa					_					
7/28/2003					Re	actor Charg	e			
						_				
TEST RUN	F-12									
			SURROGAT	F		Target			Actual	
Component			00111100711	_	Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
Оотпропени	Charge:				150	William	IIIIOI C L	O Tallis	Millinecro	IIIIOIO L
	Charge.				100					
water					120.0442	120.04		120.636		
hydraulic oil					2.0938	2.38		2.134		
cutting oil					2.0938	2.38		2.156		
IsoOctane					2.0936	2.30		none		
ISOCCIAITE								lione		
Al2O3					0.3349	0.08	83.9	0.334		
CaO		+			0.5349	0.06	163.0	0.542		
Cr2O3					0.3413	0.16	44.6	0.542		
Fe2O3					1.3032	0.04	44.6	1.303		
MgO					0.7269	0.44	435.1 375.9	0.726		
MnO					0.7269	0.36	82.1	0.726		
SiO2					8.3907	3.71	3712.7	8.389		
Na3PO4					12.2584	4.83	4831.8	12.259		
кон					0.3224	0.16	157.8	0.323		
Hg					0.0516	0.00	3.8	0.069		4
Aroclor-1260		Number of	Viais:					none		
					0.0404	0.50	577.5			500
TCE					0.8431	0.58	577.5	0.8557		580
PCE					0.0747	0.05	45.8	0.0704		46
TCA					0.0941	0.07	70.2	0.0932		70
BEHP					0.1619	0.17	165.2	0.1580		170
	Total:	1			150.0	135.55		150.7		
	1		REAGENTS							
Component	1				Grams	Milliliters	Micro L	Grams	Milliliters	Micro L
		1								
HCB		1			0.0056			0.0062		
BP					0.0029			0.0032		
FeSO4 7H2O		-			1.5			1.4993		
H2O2 (50%)					600	500		600	500	
H2SO4 (con)								11.598		
NaOH (4 M)								0.917		
	Total:	1			751.5			765		

	S Kujawa 7/29/2003 TEST RUN Results	F-12				Phase	$\neg$							
		F-12												
		F-12			Data	/Calculatio	ns							
					12414	7 Carouncial								
Run Time	Results													
Run Time			Gas Phase	Calculatio	ns									
	Gas Vol, cc	Time, sec	accm	Temp, F	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum		Rctr T
					psia		lb/ft^3	0	min.	gm/min	gm	gm		Deg C
9:45	0	1		75	12.18	31.3	0.066	0.000		0.000	0.000	0.0		
9:50	50	23.69		75	12.18	31.3	0.066	0.135		0.067	0.337	0.3		8
10:00	50	12.81	234	75	12.18	31.3	0.066	0.249	10.0	0.192	1.921	2.3		85.3
10:15	50	11.19		76	12.18	31.3	0.066	0.285	15.0	0.267	4.007	6.3		87
10:30	50	9.71	309	78	12.18	31.3	0.066	0.327	15.0	0.306	4.591	10.9		87.9
10:45	50	8.78		83	12.18	31.3	0.065	0.358	15.0	0.343	5.142	16.0		88.1
11:00	50 50	8.53	352 379	85 80	12.18	31.3	0.065	0.368	15.0	0.363 0.384	5.446	21.4		88.7
11:15	50	7.91	379		12.18	31.3	0.066	0.400	15.0	0.384	5.758	27.2		
11:30 11:45	50	7.62 7.15		79 81	12.18	31.3 31.3	0.066 0.066	0.416	15.0 15.0	0.408	6.121 6.434	33.3 39.8		89.9 89.9
11:45	50	7.15	376	81	12.18 12.18	31.3	0.066	0.442	15.0	0.429	6.434	39.8 46.0		89.9
12:00	50	8.13		82	12.18	31.3	0.066	0.389	15.0	0.419	5.881	51.9		88.6
12:15	50	7.65		81	12.18	31.3	0.066	0.389	15.0	0.392	6.011	57.9		88.8
12:45	50	7.37	407	82	12.18	31.3	0.066	0.413	15.0	0.420	6.306	64.2		89.1
13:00	50	7.47	407	83	12.18	31.3	0.065	0.420	15.0	0.425	6.369	70.6		89.2
13:15	50	6.97	430	82	12.18	31.3	0.066	0.421	15.0	0.423	6.553	77.2		89.2
13:30	50	6.84		83	12.18	31.3	0.065	0.460	15.0	0.456	6.844	84.0		89.3
13:45	50	7	429	83	12.18	31.3	0.065	0.450	15.0	0.455	6.823	90.8		89.2
14:00	50	6.72		82	12.18	31.3	0.066	0.469	15.0	0.459	6.891	97.7		89.1
14:15	50	6.91	434	83	12.18	31.3	0.065	0.455	15.0	0.462	6.935	104.7		89.6
14:30	50	8.06		83	12.18	31.3	0.065	0.390	15.0	0.423	6.345	111.0		89.3
14:45	50	9.44	318	83	12.18	31.3	0.065	0.333	15.0	0.362	5.429	116.4		88.8
15:00	50	10.75		82	12.18	31.3	0.066	0.293	15.0	0.313	4.700	121.1		88.3
15:15	50	13.85		82	12.18	31.3	0.066	0.228	15.0	0.260	3.907	125.0		88.2
15:30	50	14.5		84	12.18	31.3	0.065	0.217	15.0	0.222	3.332	128.4		87.4
15:45	50	21.62	139	83	12.18	31.3	0.065	0.146	15.0	0.181	2.717	131.1		87.5
16:00	50	26.81	112	85	12.18	31.3	0.065	0.117	15.0	0.131	1.969	133.1		87.1
16:15	50	35.56		86	12.18	31.3	0.065	0.088	15.0	0.102	1.537	134.6		86.8
16:30	10	10.58		86	12.18	31.3	0.065	0.059	15.0	0.074	1.104	135.7		86.3
16:45	10	15.94		86	12.18	31.3	0.065	0.039	15.0	0.049	0.738	136.4		84.5
17:00	10	18.5		86	12.18	31.3	0.065	0.034	15.0	0.037	0.548	137.0		84.4
17:15	10	20.25	30	86	12.18	31.3	0.065	0.031	15.0	0.032	0.486	137.5		84.6
17:30	10	13.33	45	86	12.18	31.3	0.065	0.047	15.0	0.039	0.584	138.0		84.2
17:45	10	15.34		87	12.18	31.3	0.065	0.041	15.0	0.044	0.658	138.7		84.3
18:00	10	20.59		87	12.18	31.3	0.065	0.030	15.0	0.036	0.533	139.2		84.1
18:15	10	27.78	22	87	12.18	31.3	0.065	0.022	15.0	0.026	0.396	139.6		83.6
18:30	10	32.72	18	87	12.18	31.3	0.065	0.019	15.0	0.021	0.312	139.9		83.4
18:45	10	40.18		87	12.18	31.3	0.065	0.016	15.0	0.017	0.260	140.2		83.4
19:00	10	48.12	12	86	12.18	31.3	0.065	0.013	15.0	0.014	0.214	140.4		83.6
19:15	10	62.5	10	86	12.18	31.3	0.065	0.010	15.0	0.012	0.173	140.6		83.4
19:30	5	46.78	6	86	12.18	31.3	0.065	0.007	15.0	0.008	0.125	140.7		83.4
19:45	0	1	0	86	12.18	31.3	0.065	0.000	15.0	0.003	0.050	140.8		83.3
20:00	0	1	0	86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		83.2
20:15	0	1		86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		83
20:30	0	1		86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		83
20:45	0	1		86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		82.9
21:00	0	1		86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		82.8
21:15	0	1		86	12.18	31.3	0.065	0.000		0.000	0.000	140.8		82.7
21:30	0	1		86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		82.6
21:45	0	1	0	86	12.18	31.3	0.065	0.000	15.0	0.000	0.000	140.8		83.1
							Avg's:	0.186	720.0			134.0	Avg:	86.1

S Kujawa									
7/28/2003				Test Results	Str RPM:	420	Start		
TEST RUN	F-12								
	Results								
	Product slurry Sp. Gr.:	1.03							
	Final Product Slurry, ml:	587							
	Final Product Slurry, gm:	605.1							
	Dewar Flask net wt., gm	0.8715							
	Liquid/slurry Product, gm:	606.0		(Slurry Wt, 100% H2O2/O2 RXN):	624				
	Product Gas Weight, gm:	140.8		Gas Results are "Somewhat" dum					
	Product Gas vveignt, gm.	140.8		Gas Results are Somewhat duri	my numbers	pending a	naiyses		
	Product Wt, gm:	746.7							
	Froduct Wt, gill.	740.7							
	Total Charge Weight, gm:	765							
	Total Charge Weight, gill.	700							
	Overall Mass Balance								
	Mass Balance Closure:	97.6%							
	Mass balance w/o gas:	79%							1
		[							
	Species Mass Results			Species Mass Results	NOTE				
	TriChloroEthylene			HexachloroBenzene	NOTE	Anal. code			
	Slurry analysis, 1, mg/kg:	1.910 U	J	Slurry analysis, 1, mg/k	g: 0.975				
	Slurry analysis, 2, mg/kg:	1.950 U	J	Slurry analysis, 2, mg/k	g: 0.778				
	Avg., mg/kg	1.930		Avg., mg/					
	Total, mg:	1.168		Total, mg:	0.530				
	TOE DDE N	00.0004		LIOP PDF W					
	TCE, DRE, %	99.86%		HCB, DRE, %	91.45%	<b>——</b>			
	TetraChloroEthylene			Bi-Phenyl	NOTE				
	Slurry analysis, 1, mg/kg:	1.910 U	ı	Slurry analysis, 1, mg/k		11			
	Slurry analysis, 1, mg/kg: Slurry analysis, 2, mg/kg:	1.910 U		Slurry analysis, 1, mg/k					
	Avg., mg/kg	1.930	,	Avg., mg/					
	Total, mg:	1.168		Total, mg:	2.699				
	Total, mg.	1.100		rotal, mg.	2.033				
	PCE, DRE, %	98.34%		BP, DRE, %	15.66%		Run time:	17	Hours
	1 02, 5112, 70	1		D1 , D1(2, 70		·	Run Temp:		deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol.		mi
	Slurry analysis, 1, mg/kg:	1.910 U	J	Slurry analysis, 1, mg/k	a: 0.000				
	Slurry analysis, 2, mg/kg:	1.950 U	J	Slurry analysis, 2, mg/k					
	Avg., mg/kg	1.930		Avg., mg/	g 0.000				
	Total, mg:	1.168		Total, mg:	0.000				
				-					
	TCA, DRE, %	98.75%		Aroclor, DRE, %	#VALUE!				
	BEHP	NOTE							
	Slurry analysis, 1, mg/kg:	52.400							
	Slurry analysis, 2, mg/kg:	40.400							
	Avg., mg/kg	46.400							
	Total, mg:	28.077							
	DELID DDE 0/	00.000							
	BEHP, DRE, %	82.23%							
		<del>                                     </del>							
	8/8/2003:				+				+

7/29/2003			Heat Balance				
	= 40		Treat Balance	numbers ir	red are qu	estionable.	
STRUN	F-12						
	0 1 0 1		07.5.4				
	Condenser Bath		Oil Bath				
	Cot Doint Townson Don C		O-t D-int T-man-time D-m C	400			
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
T:			Dana DO all danath, and for	0.070			
Time			Boss DS oil density, gm/ml	0.873			
			Boss DS oil heat cap. cal/gm/deg C	0.4			
	Water Return Temp, Deg C	8.1	Oil Return Temp, Deg C	75.9			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	17.44	Bucket ck time, sec	9.41			
	Flow rate, ml/min	344	Flow rate, ml/min	638			
	Enthalpy change, calorie/min:	1067	Enthalpy change, calorie/min:	-5366			
	Flask Top Surface Temp., C	75.5	Flask bottom Surface Temp., C	75.6			
	Flask Top Surface Temp., F	168	Flask bottom Surface Temp., F	168			
	Air Temp. ,F	75	Air Temp. ,F	75			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1528	Convective Loss, cal/min	2158			
	Radiative Loss, cal/min	649	Radiative Loss, cal/min	917			
		2177	Flask bottom Heat Loss, cal/min	3075	5253		
	Flask top Heat Loss, cal/min	2111	i lask bollom neat Loss, cal/imin	30/0	9203		
	December Temperature		DI 0 T 5 3				
	Reactor Temperature, C	85.3	P1 Gas Temp. Deg C.	26		<u> </u>	
	Peroxide Temperature, F	75	Gas Flow Rate, gm/min	0.192		Correlated losses, cal/min	450
	Peroxide Flow Rate, ml/min	5	Water Vap. gm/min	0.0057		Reflux Gas Delta H, cal/min	33
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	3.15		Revised Acc/generation, cal/min	23
	Peroxide Enthalpy Change, cal/min	294.8					L
			Accumulation/Generation, cal/min	-1251			
			· ·				
11:02	Water Return Temp, Deg C	8.3	Oil Return Temp, Deg C	79.3			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	17.33	Bucket ck time, sec	9.75			
	Flow rate, ml/min	346	Flow rate, ml/min				
	Enthalpy change, calorie/min:	1143	Enthalpy change, calorie/min:	-4448			
	Entralpy change, calone/min.	1140	Entitalpy change, calone/init.	-4440			
	Flook Ton Curfoso Tomp C	77.7	Flook bottom Curfoos Tomp. C	77.0			
	Flask Top Surface Temp., C	77.7	Flask bottom Surface Temp., C	77.8			
	Flask Top Surface Temp., F	172	Flask bottom Surface Temp., F	172			
	Air Temp. ,F	85	Air Temp. ,F	85			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1429	Convective Loss, cal/min	2018			
	Radiative Loss, cal/min	628	Radiative Loss, cal/min	888			
	Flask top Heat Loss, cal/min	2057	Flask bottom Heat Loss, cal/min	2906	4964		
	Reactor Temperature, C	88.7	P1 Gas Temp. Deg C.	27			
	Peroxide Temperature, F	85	Gas Flow Rate, gm/min	0.363		Correlated losses, cal/min	444
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0107		Reflux Gas Delta H, cal/min	62
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	5.95		Revised Acc/generation, cal/min	-73
	Peroxide Enthalpy Change, cal/min	113.8					1
	r croside Endialpy Change, cal/IIIII	113.0					
			Accumulation/Generation, cal/min	4770			
			Accumulation/Generation, califfin	-1778			
			Accumulation/Scheration, califfin	-1/10			
40.1-	Wester Deturn Ton: - D O						
	Water Return Temp, Deg C	8.4	Oil Return Temp, Deg C	80.2			
	bucket ck volume, ml	100	Oil Return Temp, Deg C bucket ck volume, mI	80.2 100			
	bucket ck volume, ml Bucket ck time, sec	100 17.06	Oil Return Temp, Deg C bucket ck volume, mI Bucket ck time, sec	80.2 100 9.69			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	100 17.06 352	Oil Return Temp, Deg C bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min	80.2 100 9.69 619			
	bucket ck volume, ml Bucket ck time, sec	100 17.06	Oil Return Temp, Deg C bucket ck volume, mI Bucket ck time, sec	80.2 100 9.69			
	bucket ck volume, mI Bucket ck time, sec Flow rate, mI/min Enthalpy change, calorie/min:	100 17.06 352 1196	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	80.2 100 9.69 619			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	100 17.06 352	Oil Return Temp, Deg C bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min	80.2 100 9.69 619			
	bucket ck volume, mI Bucket ck time, sec Flow rate, mI/min Enthalpy change, calorie/min:	100 17.06 352 1196	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	80.2 100 9.69 619 -4281			
	bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C	100 17.06 352 1196	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C	80.2 100 9.69 619 -4281			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F	100 17.06 352 1196 77.8 172 81	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F	80.2 100 9.69 619 -4281 78.2 173 81			
	bucket ck volume, mI Bucket ck time, sec Flow rate, mI/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft	100 17.06 352 1196 77.8 172 81	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp. ,F Overall HT coef.	80.2 100 9.69 619 -4281 78.2 173 81			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2	77.8 172 81 352 1196	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2	80.2 100 9.69 619 -4281 78.2 173 81 3			
	bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity	100 17.06 352 1196 77.8 172 81 3 188 0.94	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity	80.2 100 9.69 619 -4281 78.2 173 81 3 265 0.94			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	80.2 100 9.69 619 -4281 78.2 173 81 3 265 0.94 2128			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	80.2 1000 9.699 619 4281 173 81 3 265 0.94 2128 929			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	80.2 100 9.69 619 -4281 78.2 173 81 3 265 0.94 2128			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emis/vity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	80.2 100 9.69 619 -4281 78.2 1733 81 3 265 0.94 2128 929	5207		
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C.	80.2 100 9.69 619 -4281 78.2 173 81 3 3 265 0.94 2128 929 3057	5207		
	bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	80.2 100 9.69 6191 -4281 78.2 173 81 3 265 0.94 2128 929 3057 28	5207	Correlated losses, cal/min	
	bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150 88.6 81	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	80.2 100 9.69 4281 78.2 173 81 3 265 0.94 2128 929 3057 28 0.0392 0.0116	5207	Reflux Gas Delta H, cal/min	673
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	80.2 100 9.69 6191 -4281 78.2 173 81 3 265 0.94 2128 929 3057 28	5207		673
	bucket ck volume, mI Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150 88.6 81	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	80.2 100 9.69 4281 78.2 173 81 3 265 0.94 2128 929 3057 28 0.0392 0.0116	5207	Reflux Gas Delta H, cal/min	673
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	100 17.06 352 1196 77.8 172 81 3 188 0.94 1498 653 2150 88.6 81 2	Oil Return Temp, Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	80.2 100 9.69 4281 78.2 173 81 3 265 0.94 2128 929 3057 28 0.0392 0.0116	5207	Reflux Gas Delta H, cal/min	4375 673 -886

6 Kujawa	F-12	7/29/2003					
	Water Return Temp, Deg C	8.2	Oil Return Temp, Deg C	79.7			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	16.78	Bucket ck time, sec	9.56			
	Flow rate, ml/min Enthalpy change, calorie/min:	] 358 1144	Flow rate, ml/min Enthalpy change, calorie/min:	628 -4449			
	Entrapy sharige, salonemin.	]	Entrapy sharige, salonemin.	]			
	Flask Top Surface Temp., C	79.9	Flask bottom Surface Temp., C	77			
	Flask Top Surface Temp., F	176	Flask bottom Surface Temp., F	171			
	Air Temp. ,F	82	Air Temp. ,F	82			
	Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2	3 188	Overall HT coef. bottom flask Area, in^2	3 265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1543	Convective Loss, cal/min	2054			
	Radiative Loss, cal/min	681	Radiative Loss, cal/min	894			
	Flask top Heat Loss, cal/min	2224	Flask bottom Heat Loss, cal/min	2948	5173		
	December Terror Company	00.0	DI Con Town Don C				
	Reactor Temperature, C	89.2	P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	29 0.437		Correlated lesses and/min	4309
	Peroxide Temperature, F Peroxide Flow Rate, ml/min	82	Water Vap. gm/min	0.437		Correlated losses, cal/min Reflux Gas Delta H, cal/min	750
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	7.16		Revised Acc/generation, cal/min	-728
	Peroxide Enthalpy Change, cal/min	117.9		]		3 ,	1
			Accumulation/Generation, cal/min	-1993			
14:17	Water Return Temp, Deg C	8.5	Oil Return Temp, Deg C	79.4			
	bucket ck volume, ml	100	bucket ck volume, ml	100			
	Bucket ck time, sec	18.6	Bucket ck time, sec	9.65			
	Flow rate, ml/min		Flow rate, ml/min				-
	Enthalpy change, calorie/min:	1129	Enthalpy change, calorie/min:	-4473			-
	Flask Top Surface Temp., C	74.8	Flask bottom Surface Temp., C	75.8			
	Flask Top Surface Temp., F	167	Flask bottom Surface Temp., F	168			
	Air Temp. ,F	83	Air Temp. ,F	83			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity Convective Loss, cal/min	0.94 1376	emisivity Convective Loss, cal/min	0.94 1981			
	Radiative Loss, cal/min	594	Radiative Loss, cal/min	859			
	Flask top Heat Loss, cal/min	1970	Flask bottom Heat Loss, cal/min	2840	4810		
		1		1			
	Reactor Temperature, C	89.6	P1 Gas Temp. Deg C.	29			
	Peroxide Temperature, F	83	Gas Flow Rate, gm/min	0.008		Correlated losses, cal/min	4309
	Peroxide Flow Rate, ml/min	0.8	Water Vap. gm/min	0.0002		Reflux Gas Delta H, cal/min	14
	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min	J 0.8 0.0	P1 loss, H2O vapor, cal/min	0.14		Revised Acc/generation, cal/min	149 □
	Peroxide Entiralpy Change, califful	1					
			Accumulation/Generation, cal/min	-1467			
			·				
15:40	Water Return Temp, Deg C	9.2	Oil Return Temp, Deg C	79.3			
15:40	Water Return Temp, Deg C bucket ck volume, ml	9.2 100	Oil Return Temp, Deg C bucket ck volume, ml	<b>79.3</b> 100			
	bucket ck volume, ml Bucket ck time, sec	100 16.43	bucket ck volume, ml Bucket ck time, sec	100 9.65			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	100 16.43 365	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	100 9.65 622			
	bucket ck volume, ml Bucket ck time, sec	100 16.43	bucket ck volume, ml Bucket ck time, sec	100 9.65			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	100 16.43 365 1534	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	100 9.65 622 -4494			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C	100 16.43 365 1534 76.6	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C	100 9.65 622 -4494 78.4			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	100 16.43 365 1534	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min:	100 9.65 622 -4494			
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef, Btu/hr/F/sq ft	100 16.43 365 1534 76.6 170 83	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef.	78.4 173 83 3			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2	100 16.43 365 1534 76.6 170 83 3	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2	78.4 78.4 173 83 265			
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity	100 16.43 365 1534 76.6 170 83 3 188 0.94	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity	78.4 78.4 78.3 3 3 265 0.94			
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	100 16.43 365 1534 76.6 170 83 3 188 0.94 1429	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	78.4 78.4 173 83 265 0.94 2090			
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	100 16.43 365 1534 76.6 170 83 3 188 0.94 1429 622	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radative Loss, cal/min	78.4 173 83 3 265 0.94 2090 918	5059		
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min	100 16.43 365 1534 76.6 170 83 3 188 0.94 1429	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min	78.4 78.4 173 83 265 0.94 2090	5059		
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min	100 16.43 365 1534 76.6 170 83 3 188 0.94 1429 622 2051	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radative Loss, cal/min	100 9.65 622 44494 78.4 173 83 3 265 0.94 2090 918 3007	5059		
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in*2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F	100 16.43 365 1534 76.6 170 83 3 188 0.94 1429 622 2051 87.5	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask Temp. Deg C. Gas Flow Rate, gm/min	100 9.65 65 6494 78.4 173 83 3 265 0.94 2990 918 3007	5059	Correlated losses, cal/min	
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT Coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Tow Rate, ml/min	100 16.43 365 1534 1534 1637 83 3 3 188 0.94 1429 622 2051 87.5 83 0	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 918 3007 30 0.181 0.0053	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	100 16.43 3655 1534 76.6 170 83 3 3 188 0.94 1429 6222 2051 87.5 83 0 0 8.8	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask Temp. Deg C. Gas Flow Rate, gm/min	100 9.65 65 6494 78.4 173 83 3 265 0.94 2990 918 3007	5059	Correlated losses, cal/min	311
	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT Coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Tow Rate, ml/min	100 16.43 365 1534 1534 1637 83 3 3 188 0.94 1429 622 2051 87.5 83 0	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 918 3007 30 0.181 0.0053	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	4242 311 -59
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	100 16.43 3655 1534 76.6 170 83 3 3 188 0.94 1429 6222 2051 87.5 83 0 0 8.8	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef, bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 918 3007 30 0.181 0.0053	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	100 16.43 3655 1534 76.6 170 83 3 3 188 0.94 1429 6222 2051 87.5 83 0 0 8.8	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min	100 9.65 622 -4494 78.4 173 83 3 265 0.94 2090 918 3007 30 0.053 2.97	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. But/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gnr/degC Peroxide Enthalpy Change, cal/min	100 16.43 3656 1534 76.6 170 83 3 188 0.94 1429 6222 2051 87.5 83 0.0 0.0	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min Holss, H2O vapor, cal/min Accumulation/Generation, cal/min	100 9.65 622 14494 78.4 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.0053 2.97	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in*2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min Water Return Temp, Deg C	100 16.43 3655 1534 76.6 170 833 3 3 188 0.944 1429 622 2051 87.5 833 0 0.8 83	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min	100 9.65 622 14494 78.4 173 83 3 265 0.94 2090 918 3007 30 0.181 0.0053 2.97	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. But/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, C Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gnr/degC Peroxide Enthalpy Change, cal/min	100 16.43 3656 1534 76.6 170 83 3 188 0.94 1429 6222 2051 87.5 83 0.0 0.0	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min Holss, H2O vapor, cal/min Accumulation/Generation, cal/min	100 9.65 622 14494 78.4 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.0053 2.97	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
19:10	bucket ok volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in*2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Peroxide Flow Rate, ml/min Peroxide Flow Rate, ml/min Water Return Temp, Deg C bucket ok volume, ml Bucket ck time, sec Flow rate, ml/min	100 16.43 15.44 17.04 16.45 16	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min Mater Vap. gm/min Accumulation/Generation, cal/min Oil Return Temp, Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min	100 9.65 622 14494 173 3 265 0.94 2090 918 3007 300 0.181 0.0053 2.97 12101 78.6 100 9.72 617	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Blu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min  Water Return Temp, Deg C bucket ok volume, ml Bucket ok time, sec	100 16.43 3655 1534 76.6 170 83 3 3 188 0.94 1429 6222 2051 87.5 83 0.0 0.0 88 83 0.0 94 1429 1429 1622 1622 1622 1622 1622 1622 1622 16	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radative Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp. Deg C bucket ck volume, ml Bucket ok time, sec	100 9.65 622 -4494 78.4 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.0053 2.97 -2101 78.6	5059	Correlated losses, cal/min Reflux Gas Delta H, cal/min	311
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19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min Water Return Temp, Deg C bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Siask Top Surface Temp., C Flask Top Surface Temp., C Siask Top Surface Temp., C Flask Top Surface Temp., C Riask	100 16.43 16.43 76.6 170 183 3 3 188 0.94 1429 2051 87.5 83 0.0 8.8 0.0 0.0 8.5 100 0.8 8.5 1137 86 86 0.94 1173 497 1670 83.4 86	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp. Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.053 2.97 12101 78.6 1000 78.6 1000 9.72 617 4613 75.5 1688 86 0.94 1.999 828 2728 30.5 0.012	4397	Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min Revised Acc/generation, cal/min Correlated losses, cal/min Reflux Gas Delta H, cal/min	4209 20
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min Water Return Temp, Deg C bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Readiative Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min Peroxide Heat Cap, cal/gm/degC	100 16.43 16.43 76.6 170 833 3855 188 0.94 1429 20515 87.5 83 0 0 8.8 0.00 100 1137 69.6 1137 69.6 188 0.94 1173 866 0.94 1173 866 0.94 1173 867 866 0.94 83.4	bucket ck volume, ml Bucket ck violume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Radiative Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min Water Vap. gm/min Oil Return Temp. Deg C bucket ck volume, ml Bucket ck volume, ml Bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	100 9.65 622 14494 78.4 173 3 265 9.94 2090 918 3007 30 0.181 0.0053 2.97 1-2101 78.6 100 9.72 617 4613 75.5 168 86 3 2.65 0.94 1899 828 2728 3278 30.55	4397	Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	3111 -59
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in^2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min Water Return Temp, Deg C bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., C Siask Top Surface Temp., C Flask Top Surface Temp., C Siask Top Surface Temp., C Flask Top Surface Temp., C Riask	100 16.43 16.43 76.6 170 183 3 3 188 0.94 1429 2051 87.5 83 0.0 8.8 0.0 0.0 8.5 100 0.8 8.5 1137 86 86 0.94 1173 497 1670 83.4 86	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp. Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.053 2.97 12101 78.6 1000 78.6 1000 9.72 617 4613 75.5 1688 86 0.94 1.999 828 2728 30.5 0.012	4397	Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min Revised Acc/generation, cal/min Correlated losses, cal/min Reflux Gas Delta H, cal/min	4209 20
19:10	bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Reactor Temperature, C Peroxide Temperature, F Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/min Water Return Temp, Deg C bucket ok volume, ml Bucket ok time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask Top Surface Temp., C Flask Top Surface Temp., F Air Temp., F Overall HT coef. Btu/hr/F/sq ft Top flask Area, in'2 emisivity Convective Loss, cal/min Flask top Heat Loss, cal/min Readiative Loss, cal/min Reactor Temperature, C Peroxide Flow Rate, ml/min Peroxide Heat Cap, cal/gm/degC	100 16.43 16.43 76.6 170 833 3855 188 0.94 1429 20515 87.5 83 0 0 8.8 0.00 100 1137 69.6 1137 69.6 188 0.94 1173 866 0.94 1173 866 0.94 1173 867 866 0.94 83.4	bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Flask bottom Heat Loss, cal/min P1 Gas Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min P1 loss, H2O vapor, cal/min Accumulation/Generation, cal/min Oil Return Temp. Deg C bucket ck volume, ml Bucket ck time, sec Flow rate, ml/min Enthalpy change, calorie/min: Flask bottom Surface Temp., C Flask bottom Surface Temp., F Air Temp., F Overall HT coef. bottom flask Area, in^2 emisivity Convective Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Radiative Loss, cal/min Flask bottom Heat Loss, cal/min Flask bottom Heat Loss, cal/min Flask Temp. Deg C. Gas Flow Rate, gm/min Water Vap. gm/min	100 9.65 622 14494 173 83 3 265 0.94 2090 9188 3007 30 0.181 0.053 2.97 12101 78.6 1000 78.6 1000 9.72 617 4613 75.5 1688 86 0.94 1.999 828 2728 30.5 0.012	4397	Correlated losses, cal/min Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min Revised Acc/generation, cal/min Correlated losses, cal/min Reflux Gas Delta H, cal/min	4209 20

C Kujawa									
S Kujawa			Decetes	r Charge	$\neg$				
8/18/2003			Reactor	Charge					
TEST RUN	F-16								
		SURROGATE		Target			Actual		
Component			Grams	Milliliters	Micro L	Grams	Milliliters	Micro L	
	Charge:		150						
water			120.0442	120.04		120.537			
hydraulic oil			2.0938	2.38		2.067			
cutting oil			2.0938	2.38		2.088			
Al2O3			0.3349	0.08	83.9	0.3351			
CaO			0.5413	0.16	163.0	0.5407			
Cr2O3			0.2326	0.04	44.6	0.2331			
Fe2O3			1.3032	0.44	435.1	1.3036			
MgO			0.7269	0.38	375.9	0.7270			
MnO			0.4254	0.08	82.1	0.4255			
SiO2			8.3907	3.71	3712.7	8.3912			
Na3PO4			12.2584	4.83	4831.8	12.2585			
KOH			0.3224	0.16	157.8	0.3220			
Hg			0.0516	0.00	3.8	0.0729		4	
9			0.00.0	0.00	0.0	3,3,25		·	
Aroclor-1260			0.0070	0.0045	4.5	0.0135			
7 11 00101 1200			5.55.5	0.0010		0.0.00			
TCE			0.8431	0.58	577.5	0.8516		580	
PCE			0.0747	0.05	45.8	0.0750		46	
TCA			0.0941	0.03	70.2	0.0809		70	
BEHP			0.1619	0.07	165.2	0.1656		170	
DEFIF	Total:		150.0	135.56	100.2	150.5		170	
	TOtal.		150.0	130.00		130.3			
		REAGENTS							
0		REAGENTS		Milliliters	NA 1 1		Milliliters	Micro L	
Component			Grams	willliters	Micro L	Grams	willinters	WICO L	
HCB						0.0060			
BP BP						0.0060			
DF						0.0030			
FeSO4 7H2O			1.5			4 5000			
F6904 / HZO			1.5			1.5002			
11000 (500)									
H2O2 (50%)			600	500		600	500		
H2SO4 (con)						15.7009			
NaOH (4 M)						8.582			
						L			
	Total:		751.5			776.3			

	S Kujawa													
	8/18/2003													
	TEST RUN	F-16												
								, .						
Run Time	Gas Vol, cc	Time, sec	accm	Temp, C	P baro	MW	Density	gm/min	Time delta	Rate avg	Mass delta	Mass sum		Rctr T
					psia		lb/ft^3	0	min.	gm/min	gm	gm		Deg C
7:30	50	9.5	316	20	12.08	31.3	0.067	0.338	0.0	0.169	0.00	0.0		90.4
7:35	50	10.28	292	20	12.08	31.3	0.067	0.313	5.0	0.325	1.63	1.6		89.6
7:45	50	7.09	423	20	12.08	31.3	0.067	0.453	10.0		3.83	5.5		91.6
8:00	50	6.97	430	19.5	12.08	31.3	0.067	0.462	15.0	0.458	6.86	12.3		92.4
8:15	50	7.12	421	19.5	12.08	31.3	0.067	0.452	15.0	0.457	6.86	19.2		92.3
8:30	50	7.35	408	19	12.08	31.3	0.067	0.439	15.0	0.445	6.68	25.9		91.9
8:45	50	8.78	342	18.5	12.08	31.3	0.067	0.368	15.0		6.05	31.9		91.7
9:00	50	7.75	387	18.5	12.08	31.3	0.067	0.417	15.0		5.89	37.8		91.6
9:15	50	7.88	381	18	12.08	31.3	0.067	0.411	15.0	0.414	6.21	44.0		91.7
9:30	50	7.56	397	19	12.08	31.3	0.067	0.427	15.0	0.419	6.28	50.3		92
9:45 10:00	50 50	7.78	386	19.5	12.08	31.3	0.067 0.067	0.414 0.408	15.0		6.30	56.6		91.9
10:00	50	7.88 7.69	381 390	20 20	12.08 12.08	31.3 31.3	0.067	0.408	15.0 15.0	0.417 0.413	6.26 6.19	62.8 69.0		92.4 92.7
10:30	50	7.54	398	21	12.08	31.3	0.067	0.415	15.0	0.413	6.32	75.4		92.7
10:30	50	7.54	400	21	12.08	31.3	0.067	0.423	15.0	0.421	6.39	81.7		92.5
11:00	50	7.28	412	22	12.08	31.3	0.066	0.438	15.0		6.49	88.2		92.6
11:15	50	7.59	395	22	12.08	31.3	0.066	0.421	15.0	0.430	6.44	94.7		92.7
11:30	50	7.38	407	23	12.08	31.3	0.066	0.432	15.0		6.39	101.1		92.7
11:45	50	7.97	376	23	12.08	31.3	0.066		15.0		6.23	107.3		93.4
12:00	50	9.18	327	24	12.08	31.3	0.066	0.346	15.0	0.373	5.59	112.9		93
12:15	50	10.81	278	24	12.08	31.3	0.066	0.293	15.0	0.320	4.79	117.7		92.6
12:30	50	13.22	227	25	12.08	31.3	0.066	0.239	15.0		4.00	121.7		91.9
12:45	50	15.31	196	25	12.08	31.3	0.066	0.206	15.0		3.34	125.0		91.5
13:00	50	18.56	162	25	12.08	31.3	0.066	0.170	15.0		2.82	127.8		91.1
13:15	50	22.79	132	26	12.08	31.3	0.066	0.138	15.0	0.154	2.32	130.2		90.7
13:30	50	26.31	114	26	12.08	31.3	0.066	0.120	15.0		1.94	132.1		90.3
13:45	50 50	31.31 35.81	96	27 28	12.08 12.08	31.3	0.065	0.100	15.0		1.65	133.8		90.1
14:00 14:15	10	21.53	84 28	28	12.08	31.3 31.3	0.065 0.065	0.088	15.0 15.0	0.094 0.058	1.41 0.87	135.2 136.0		89.9 88.3
14:30	20	20.72	58	27	12.08	31.3	0.065	0.029	15.0	0.038	0.67	136.7		87.4
14:45	10	17	35	27	12.08	31.3	0.065		15.0	0.049	0.73	137.4		86.8
15:00	10	13.59	44	27	12.08	31.3	0.065	0.046	15.0		0.62	138.1		86.3
15:15	10	18.34	33	28	12.08	31.3	0.065		15.0	0.040	0.60	138.7		86.3
15:30	10	16.91	35	28	12.08	31.3	0.065	0.037	15.0		0.53	139.2		85.9
15:45	10	20.66	29	28	12.08	31.3	0.065	0.030	15.0	0.034	0.51	139.7		85.9
16:00	10	30.91	19	28	12.08	31.3	0.065	0.020	15.0	0.025	0.38	140.1		85.8
16:15	10	25.19	24	28	12.08	31.3	0.065		15.0		0.34	140.4		85.7
16:30	10	37.35	16	28	12.08	31.3	0.065	0.017	15.0		0.31	140.7		85.6
16:45	10	37.25	16	28	12.08	31.3	0.065	0.017	15.0		0.25	141.0		85.8
17:00	10	46.38	13	28	12.08	31.3	0.065	0.013	15.0		0.23	141.2		85.5
17:15	10	52.41	11	28	12.08	31.3	0.065	0.012	15.0	0.013	0.19	141.4		85.5
17:30 17:45	6 10	37.5 54.75	10 11	28 28	12.08 12.08	31.3 31.3	0.065 0.065	0.010 0.011	15.0 15.0		0.16 0.16	141.6		85.3 85.1
18:00	10	60.28	10	28	12.08	31.3	0.065	0.011	15.0	0.011 0.011	0.16	141.7 141.9		85.1 85.2
18:00	5		8	28	12.08	31.3	0.065	0.010	15.0		0.16	141.9		85.2 85.3
18:30	10		8	28	12.08	31.3	0.065	0.009	15.0	0.008	0.14	142.2		85.1
18:45	5	44.5	7	28	12.08	31.3	0.065	0.007	15.0	0.008	0.13	142.3		85
19:00	0	1	0	29	12.08	31.3	0.065	0.000	15.0	0.004	0.05	142.3		85.1
19:15	0		0	29	12.08	31.3	0.065	0.000	15.0	0.000	0.00	142.3		84.9
19:30	0	1	0	29	12.08	31.3	0.065	0.000	15.0		0.00	142.3		84.8
							A∨g's:	0.200	720.0			143.9	Avg:	89.1

	S Kujawa									
	8/27/2003									
	TEST RUN	F-16								
Run Time	% O2	% CO2	% H2O	% CO	PPMv TCE	PPMv PCE	PPMv TCA	MW		
7:30	95.7%	0.1353%	4%	0.0039%	0	0	0	31.4		
7:35	95.7%	0.1353%	4%	0.0039%	16	0	0	31.4		
7:45	95.7%	0.1419%	4%	0.0039%	0	0	0	31.4		
8:00	95.7%	0.1485%	4%	0.0039%	0	9	0			
8:15	95.7%	0.1333%	4%	0.0039%	0	0	0			
8:30	95.7%	0.1180%	4%	0.0039%	0	0	0			
8:45	95.7%	0.0915%	4%	0.0039%	0	0	0			
9:00	95.7%	0.0650%	4%	0.0037%	0	o o	0			
9:15	95.7%	0.0745%	4%	0.0035%	0	Ö	ō			
9:30	95.7%	0.0839%	4%	0.0035%	0	0	0			
9:45	95.7%	0.0815%	4%	0.0035%	0	0	0			
10:00	95.7%	0.0791%	4%	0.003376	0	0	0			
10:00	95.7%	0.1242%	4%	0.0042%	0	0	0			
10:30	95.6%	0.1693%	4%	0.0049%	0	0	0			
10:45	95.7%	0.1448%	4%	0.0049%	0	0	0			
11:00	95.7%	0.1202%	4%	0.0045%	0	ő	0			
11:15	95.7%	0.0788%	4%	0.0041%	0	0	0			
11:30	95.8%	0.0374%	4%	0.0041%	0	0	0			
11:45	95.7%	0.0890%	4%	0.0041%	0	0	0			
12:00	95.7%	0.1405%	4%	0.0041%	0	0	0			
12:15	95.7%	0.1474%	4%	0.0043%	0	0	0			
12:30	95.6%	0.1542%	4%	0.0048%	0	0	0			
12:45	95.7%	0.1342%	4%	0.0048%	0	0	0			
13:00	95.7%	0.1095%	4%	0.0059%	0	0	0			
13:15	95.7%	0.1093%	4%	0.003976	0	0	0			
13:30	95.7%	0.1207 %	4%	0.0070%	0	0	0			
13:45	95.6%	0.1436%	4%	0.0070%	0	0	0			
14:00	95.6%	0.1932%	4%	0.0076%	0	0	0			
14:15	95.6%	0.1891%	4%	0.0022%	0	0	0			
14:13	95.6%			0.0022%	0	0	0			
14:30	95.6%	0.1849% 0.2115%	4% 4%	0.0022%	0	0	0			
15:00	95.6%	0.2115%	4%	0.0022%	0	0	0			
15:00		0.2381%	4%	0.0039%	0	0	0			
15:30	95.6% 95.6%	0.1938%	4%	0.0095%	0	0	0			
15:30	95.6%	0.1494%		0.0095%	0	0	0			
16:00	95.6%	0.1661%	4% 4%	0.0095%	0	0	0			
	95.6%		4%	0.0124%	0	0	0			
16:15 16:30	95.6%	0.1687% <b>0.1546</b> %	4%	0.0153%	0	0	0			
16:30	95.6%		4%		0	0	0			
		0.2025%		0.0153%	0	0	0			
17:00	95.5%	0.2503%	4%	0.0153%	0					
17:15	95.6%	0.2022%	4%	0.0153%		0	0			
17:30	95.6%	0.1541%	4%	0.0153%	0	0	0			
17:45	95.6%	0.1694%	4%	0.0153%		0				
18:00	95.6%	0.1846%	4%	0.0153%	0		0			
18:15	95.6%	0.1771%	4%	0.0153%		0	0			
18:30	95.6%	0.1696%	4%	0.0153%	0	0	0			
18:45	95.6%	0.1621%	4%	0.0153%	0	0	0			
19:00	95.6%	0.1545%	4%	0.0153%	0	0	0			
19:15	95.6%	0.1552%	4%	0.0153%	0	0	0			
19:30	95.6%	0.1558%	4%	0.0153%	0	0	0	31.4		

									1					
	S Kujawa													
	8/27/2003													
	TEST RUN	F-16												
	Instantaneous r	atoe.						Integrated	quantities:					
	O2, gm/min	CO2, g/m	H2O g/m	CO g/m	TCE g/m	PCE g/m	TCA g/m	O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gn
	Oz, gili/illili	CO2, g/III	1120 g/iii	CO g/III	TOL gill	FOL g/III	TCA g/III	Oz, giii	CO2, giii	1120 giii	COgiii	TOL gill	FCL gill	I CA gii
lun Time														
7:30	0.3309	0.0006	0.0082	1.18E-05	0.0000	0.0000	0.0000		0.000643427		1.18024E-05		0.00E+00	0.00E+
7:35	0.3058	0.0006	0.0075	1.09E-05	0.0000	0.0000	0.0000	1.592	0.004	0.047	0.000	5.23E-05	0.00E+00	0.00E+
7:45	0.4433	0.0009	0.0109	1.58E-05	0.0000	0.0000	0.0000	5.337	0.011	0.140	0.000	1.57E-04	0.00E+00	0.00E-
8:00	0.4517	0.0010	0.0111	1.61E-05	0.0000	0.0000	0.0000	12.049	0.025	0.305	0.000	1.57F-04	1.65E-04	0.00E-
8:15	0.4422	0.0008	0.0109	1.58E-05	0.0000	0.0000	0.0000	18.753	0.039		0.001	1.57E-04		0.00E-
8:30	0.4292	0.0007	0.0106	1.53E-05	0.0000	0.0000	0.0000	25.289	0.051		0.001	1.57E-04		0.00E+
								24.209						
8:45	0.3600	0.0005	0.0089	1.28E-05	0.0000	0.0000	0.0000	31.208	0.060		0.001	1.57E-04		0.00E+
9:00	0.4080	0.0004	0.0101	1.38E-05	0.0000	0.0000	0.0000	36.968	0.066		0.001		3.31E-04	0.00E+
9:15	0.4019	0.0004	0.0099	1.29E-05	0.0000	0.0000	0.0000	43.042	0.072		0.002	1.57E-04		0.00E+
9:30	0.4174	0.0005	0.0103	1.34E-05	0.0000	0.0000	0.0000	49.187	0.079		0.002	1.57E-04		0.00E+
9:45	0.4049	0.0005	0.0100	1.30E-05	0.0000	0.0000	0.0000	55.354	0.086		0.002	1.57E-04	3.31E-04	0.00E+
10:00	0.3991	0.0005	0.0098	1.53E-05	0.0000	0.0000	0.0000	61.385	0.093		0.002	1.57E-04		0.00E+
10:15	0.4088	0.0007	0.0101	1.83E-05	0.0000	0.0000	0.0000	67.444	0.102		0.002	1.57E-04		0.00E+
10:30	0.4153	0.0007	0.0101	1.86E-05	0.0000	0.0000	0.0000	73.625	0.102		0.002	1.57E-04		0.00E+
					0.0000									
10:45	0.4176	0.0009	0.0103	1.87E-05	0.0000	0.0000	0.0000	79.872	0.129		0.003	1.57E-04		0.00E+
11:00	0.4289	0.0007	0.0106	1.77E-05	0.0000	0.0000	0.0000	86.221	0.142		0.003	1.57E-04		0.00E+
11:15	0.4116	0.0005	0.0101	1.54E-05	0.0000	0.0000	0.0000		0.151		0.003	1.57E-04		
11:30	0.4227	0.0002	0.0104	1.58E-05	0.0000	0.0000	0.0000	98.781	0.156		0.004	1.57E-04	3.31E-04	0.00E+
11:45	0.3906	0.0005	0.0096	1.46E-05	0.0000	0.0000	0.0000	104.881	0.161	2.595	0.004	1.57E-04	3.31E-04	0.00E+
12:00	0.3383	0.0007	0.0083	1.38E-05	0.0000	0.0000	0.0000		0.170		0.004	1.57E-04		0.00E+
12:15	0.2868	0.0006	0.0071	1.26E-05	0.0000	0.0000	0.0000		0.180		0.004	1.57E-04		0.00E+
12:30	0.2341	0.0005	0.0058	1.03E-05	0.0000	0.0000	0.0000		0.188		0.005	1.57E-04		0.00E+
12:45	0.2019	0.0003	0.0050	8.86E-06	0.0000	0.0000	0.0000		0.185		0.005	1.57E-04		0.00E+
					0.0000									
13:00	0.1666	0.0003	0.0041	8.99E-06	0.0000	0.0000	0.0000	124.977	0.200		0.005	1.57E-04		0.00E+
13:15	0.1354	0.0002	0.0033	8.67E-06	0.0000	0.0000	0.0000		0.204		0.005	1.57E-04		0.00E+
13:30	0.1173	0.0002	0.0029	7.51E-06	0.0000	0.0000	0.0000		0.207		0.005	1.57E-04		0.00E+
13:45	0.0982	0.0002	0.0024	6.29E-06	0.0000	0.0000	0.0000	130.752	0.211	3.233	0.005	1.57E-04	3.31E-04	0.00E+
14:00	0.0855	0.0002	0.0021	3.60E-06	0.0000	0.0000	0.0000	132.130	0.214		0.005	1.57E-04		0.00E+
14:15	0.0285	0.0001	0.0007	5.74E-07	0.0000	0.0000	0.0000	132.985	0.217		0.005	1.57E-04		0.00E+
14:30	0.0592	0.0002	0.0015	1.19E-06	0.0000	0.0000	0.0000		0.219		0.005	1.57E-04		0.00E+
14:45	0.0361	0.0002	0.0009	7.27E-07			0.0000		0.219		0.005	1.57E-04		0.00E+
					0.0000	0.0000								
15:00	0.0451	0.0002	0.0011	2.42E-06	0.0000	0.0000	0.0000		0.223		0.005	1.57E-04		0.00E+
15:15	0.0333	0.0001	0.0008	2.90E-06	0.0000	0.0000	0.0000	135.555	0.224		0.005	1.57E-04		0.00E+
15:30	0.0362	0.0001	0.0009	3.15E-06	0.0000	0.0000	0.0000		0.226		0.005	1.57E-04		0.00E+
15:45	0.0296	0.0001	0.0007	2.57E-06	0.0000	0.0000	0.0000	136.571	0.227	3.377	0.005	1.57E-04		0.00E+
16:00	0.0198	0.0001	0.0005	2.25E-06	0.0000	0.0000	0.0000		0.228	3.386	0.005	1.57E-04		0.00E+
16:15	0.0243	0.0001	0.0006	3.40E-06	0.0000	0.0000	0.0000	137.272	0.229		0.006	1.57E-04	3.31E-04	0.00E+
16:30	0.0164	0.0000	0.0004	2.29E-06	0.0000	0.0000	0.0000		0.229		0.006	1.57E-04		0.00E+
16:45	0.0164	0.0000	0.0004	2.30E-06	0.0000	0.0000	0.0000	137.823	0.229		0.006	1.57E-04		0.00E+
17:00		0.0000	0.0004	1.85E-06	0.0000				0.230		0.006	1.57E-04		0.00E+
	0.0132					0.0000	0.0000							
17:15	0.0117	0.0000	0.0003	1.63E-06	0.0000	0.0000	0.0000	138.231	0.231		0.006	1.57E-04		0.00E+
17:30	0.0098	0.0000	0.0002	1.37E-06	0.0000	0.0000	0.0000		0.232		0.006	1.57E-04		0.00E+
17:45	0.0112	0.0000	0.0003	1.56E-06	0.0000	0.0000	0.0000	138.549	0.232		0.006	1.57E-04		0.00E+
18:00	0.0101	0.0000	0.0003	1.42E-06	0.0000	0.0000	0.0000	138.709	0.232	3.429	0.006	1.57E-04	3.31E-04	0.00E+
18:15	0.0079	0.0000	0.0002	1.10E-06	0.0000	0.0000	0.0000	138.845	0.233		0.006	1.57E-04		0.00E-
18:30	0.0086	0.0000	0.0002	1.21E-06	0.0000	0.0000	0.0000		0.233		0.006	1.57E-04		0.00E-
18:45	0.0069	0.0000	0.0002	9.62E-07	0.0000	0.0000	0.0000	139.085	0.233		0.006	1.57E-04		0.00E-
					0.0000									
19:00	0.0000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.0000		0.233		0.006	1.57E-04		0.00E+
19:15	0.0000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.0000	139.136	0.233		0.006	1.57E-04		0.00E+
19:30	0.0000	0.0000	0.0000	0.00E+00	0.0000	0.0000	0.0000	139.136	0.233	3.440	0.006	1.57E-04	3.31E-04	0.0000E+
								O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gn
								Sum of con		142.82		3		3
								5. 5511	,	\				
										VOC is	100 feet	A A46**	0.4440	
										VOC in gas/ V	OU fed	0.018%	0.441%	0.000

C Kuiawa			T.			T		
S Kujawa 8/18/2003			Test Results	Str RPM:		Start		
0/10/2003			Test Nesults	SII KPIVI.		Start		
TEST RUN	F-16							
IEST KUN	Results							
	Product slurry Sp. Gr.:	1.04						
	Final Product Slurry, ml:	595						
	Final Product Sidiry, IIII.	393						
	First Deady of Characters	040.4						
	Final Product Slurry, gm:	619.4 0.6152						
	Dewar Flask net wt., gm	620.0	(Clumy)A# 1000/ LI202/02 BXN):	635				
	Liquid/slurry Product, gm:	620.0	(Slurry Wt, 100% H2O2/O2 RXN):	630				
	Product Gas Weight, gm:	142.3						
	Product Gas vveignt, gm.	142.3						
	Product Wt, gm:	762.3						
	Product Wt, giii:	102.3						
	Total Charge Weight, gm:	776.3						
	Total Charge Weight, gill:	110.3						
	Overall Mass Balance							
	Mass Balance Closure:	98.2%						
	Wass Balance Closure.	50.276						
	Mass balance w/o gas:	80%						
	Wass balance w/o gas.	0070						
	Species Mass Results		Species Mass Results					
	Opecies mass itesuits		Opecies mass itesuits					
	TriChloroEthylene	Anal code	HexachloroBenzene		Anal. code			
	Slurry analysis, 1, mg/kg:	1.930 U	Slurry analysis, 1, mg/kg:	0.605				
	Slurry analysis, 1, mg/kg:	1.960 U	Slurry analysis, 1, mg/kg.	4.920				
	Avg., mg/kg	1.945	Avg., mg/kg					
	Total, mg:	1.205	Total, mg:	1.711				
	Total, mg.	1.203	Total, mg.	1.7 1 1				
	TCE, DRE, %	99.86%	HCB, DRE, %	71.48%				
	TOE, DIKE, 70	33.0070	TIOD, DICE, 70	7 1.40 70				
	TetraChloroEthylene		Bi-Phenyl					
	Slurry analysis, 1, mg/kg:	1.930 U	Slurry analysis, 1, mg/kg:	4.730	11			
	Slurry analysis, 1, mg/kg:	1.960 U	Slurry analysis, 1, mg/kg: Slurry analysis, 2, mg/kg:	4.920				
	Avg., mg/kg	1.945	Avg., mg/kg	4.825				
	Total, mg:	1.205	Total, mg:	2.989				
	Total, mg.	1.200	Total, mg.	2.505		Run time:	12	Hours
	PCE, DRE, %	98.39%	BP, DRE, %	0.38%		Run Temp:		deg C
	TOE, DIE, 70		Dr., Dr.C., 70	0.0070		H2O2 vol:	500	mi
	1,1,1-TriChloroEthane		Aroclor 1260			AM MACANIAN CONTRACTOR OF THE		MMessanassas
	Slurry analysis, 1, mg/kg:	1.930 U	Slurry analysis, 1, mg/kg:	1.600				
	Slurry analysis, 2, mg/kg:	1.960 U	Slurry analysis, 2, mg/kg:	1.000				
	Avg., mg/kg	1.945	Avg., mg/kg	1.600				
	Total, mg:	1.205	Total, mg:	0.991				
			Total, mg					
	TCA, DRE, %	98.51%	Aroclor, DRE, %	92.66%				
			7.000,0,0,0,0,0					
	BEHP							
	Slurry analysis, 1, mg/kg:	29.500						
	Slurry analysis, 2, mg/kg:	27.400						
	Avg., mg/kg	28.450						
	Total, mg:	17.622						
	BEHP, DRE, %	89.36%						
	,,							
	VOA and SVOA							
	not yet available. DRE is a place he	older.	1					
	Stk 8/11/03							
			1			1		

S Kujawa 8/18/2003		Heat Balance					
TEST RUN	F-16						
	Condenser Bath		Oil Bath				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
		The heat balance	ce and heat generation calculations a	re verv			
Check heat tra	nsfer coef and do error	uncertain	_	· -			
			hysical properties for the heating oil. determine operating heat capacities a				
			Boss DS oil density, gm/ml	0.873			
			Boss DS oil heat cap. cal/gm/deg	0.4			
8:50	Water Return Temp, Deg C bucket ck volume, ml	6.6 1000	Oil Return Temp, Deg C bucket ck volume, ml	78.8 1000			
	Bucket ck time, sec	56.15	Bucket ck time, sec	96.71			
	Flow rate, ml/min Enthalpy change, calorie/min:	1069 1710	Flow rate, ml/min Enthalpy change, calorie/min:	620 -4593			
	Flask Top Surface Temp., C	65.3	Flask bottom Surface Temp., C	73.6			
	Flask Top Surface Temp., F	150	Flask bottom Surface Temp., F	164			
	Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft	<b>65.4</b> 2.75	Air Temp. ,F Overall HT coef.	<b>65.4</b> 2.75			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity Convective Loss, cal/min	0.94 1269	emisivity Convective Loss, cal/min	0.94 2106			
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	546 1815	Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	944 3050	4865		
					4003		
	Reactor Temperature, C Peroxide Temperature, F	91.7 65.4	P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	20.5 0.403		Correlated losses, cal/min	4874
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0119		Reflux Gas Delta H, cal/min	693
	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mi	0.8 140.4	P1 loss, H2O vapor, cal/min	6.61		Revised Acc/generation, cal/min	-1114
			Accumulation/Generation_cal/min	2126			
			Accumulation/Generation, cal/min	-2129			
	Correlated losses, cal/min Reflux Gas Delta H, cal/min	4874 693					
	Revised Acc/generation, cal/min	-1114					
9-50	Water Return Temp, Deg C	6.8	Oil Return Temp, Deg C	79.2			
0.00	bucket ck volume, ml	1000	bucket ck volume, ml	1000			
	Bucket ck time, sec Flow rate, ml/min	56.15 1069	Bucket ck time, sec Flow rate, ml/min	96.71 620			
	Enthalpy change, calorie/min:	1923	Enthalpy change, calorie/min:	-4506			
	Flask Top Surface Temp., C	68	Flask bottom Surface Temp., C	72.5			
	Flask Top Surface Temp., F Air Temp. ,F	154 67.2	Flask bottom Surface Temp., F Air Temp. ,F	163 67.2			
	Overall HT coef. Btu/hr/F/sq ft	2.7	Overall HT coef.	2.7			
	Top flask Area, in^2 emisivity	188 0.94	bottom flask Area, in^2 emisivity	265 0.94			+
	Convective Loss, cal/min	1291 576	Convective Loss, cal/min Radiative Loss, cal/min	1989 907			
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	1867	Flask bottom Heat Loss, cal/min	2896	4763		
	Reactor Temperature, C	91.9	P1 Gas Temp. Deg C.	21.5			-
	Peroxide Temperature, F	67.2	Gas Flow Rate, gm/min	0.420		Correlated losses, cal/min	480
	Peroxide Flow Rate, ml/min Peroxide heat Cap, cal/gm/degC	0.8	Water Vap. gm/min P1 loss, H2O vapor, cal/min	0.0124 6.88		Reflux Gas Delta H, cal/min Revised Acc/generation, cal/min	72 -116
	Peroxide Enthalpy Change, cal/mi						
			Accumulation/Generation, cal/min	-2326			
	Correlated losses, cal/min	4807					_
	Reflux Gas Delta H, cal/min	721					
	Revised Acc/generation, cal/min	-1161	lour.to-			<u> </u>	
10:50	Water Return Temp, Deg C bucket ck volume, ml	6.9 1000	Oil Return Temp, Deg C bucket ck volume, ml	79.1 1000			+
	Bucket ck time, sec	56.25	Bucket ck time, sec	95.6			
	Flow rate, ml/mir Enthalpy change, calorie/min:	1067 2027	Flow rate, ml/min Enthalpy change, calorie/min:	628 -4581			
	Flask Top Surface Temp., C	69.7	Flask bottom Surface Temp., C	72.8			+ =
	Flask Top Surface Temp., F	157	Flask bottom Surface Temp., F	163			
	Air Temp. ,F Overall HT coef. Btu/hr/F/sq ft	69.8 2.7	Air Temp. ,F Overall HT coef.	69.8 2.7			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity Convective Loss, cal/min	0.94 1298	emisivity Convective Loss, cal/min	0.94 1946			_
	Radiative Loss, cal/min Flask top Heat Loss, cal/min	588 1886	Radiative Loss, cal/min Flask bottom Heat Loss, cal/min	895 2841	4726		
					4/26		
·	Reactor Temperature, C Peroxide Temperature, F	<b>92.5</b> 69.8	P1 Gas Temp. Deg C. Gas Flow Rate, gm/min	23 0.426		Correlated losses, cal/min	470
	Peroxide Flow Rate, ml/min	2	Water Vap. gm/min	0.0126		Reflux Gas Delta H, cal/min	73
	Peroxide heat Cap, cal/gm/degC Peroxide Enthalpy Change, cal/mi	0.8 137.3	P1 loss, H2O vapor, cal/min	6.98		Revised Acc/generation, cal/min	-990
							_

11:35 Water R bucket c Bucket c Bucket c Bucket r Enthalpy Flask TC Air Tem Overall I Top flas emisivity Convect Radiativ Flask to Reactor Peroxide Peroxide Peroxide Peroxide Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy	all HT coef. Btu/hr/F/sq ft flask Area, in^2	uncertain due to lack of being made 6.9 1000 56.13	Oil Bath  Set Point Temperature, Deg C  lance and heat generation calculations are of physical properties for the heating oil. It to determine operating heat capacities are larger of the determine operating heat capacities are larger of the heating oil. It to determine operating heat capacities are larger of the larger of	Efforts are			
11:35 Water R bucket c Bucket of Enthalpy Flask To Flask To Flask To Air Tem Overall I Top flas emisivity Convect Radiativ Flask to Reactor Peroxidd Peroxidd Peroxidd Peroxidd Peroxidd Peroxide Peroxide Correlat Reflux C Revised	er Return Temp, Deg C et ck volume, ml et ck time, sec Flow rate, ml/min alpy change, calorie/min:  < Top Surface Temp., C < Top Surface Temp., F emp., F emp., F all HT coef. Btu/hr/F/sq ft llask Area, in*2 ivity rective Loss, cal/min	6.9 1000 56.13 1069 2031 71.9 161 73.4 2.65 188 0.94 1279 602	Set Point Temperature, Deg C  Jance and heat generation calculations are of physical properties for the heating oil. It to determine operating heat capacities at the determine operating heat capacities at the determine operating heat cap. cal/gm/deg of the determine operating heat cap. cal/gm/deg of the determine operating heat cap. cal/gm/deg of the determine operating heat cap. cal/gm/deg of the determine operating heat cap. cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg of the determine operating heat capacities and the determine operating heat capacities at the determine operating heat capacities at the determine operating heat capacities at the determine operating heat capacities at the determine operating heat capacities at the determine operating heat cap. Cal/gm/deg of the determine operating heat cap. Cal/gm/deg o	e very  Efforts are end densities.  0.873 0.4  80.8 1000 96.56 621 4166  74.7 166 73.4 2.65 265			
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Peroxide Peroxide Peroxide Peroxide Peroxide Peroxide  Correlat Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy Flask T Flask T	ctor Temperature, C	93.4	P1 Gas Temp. Deg C.	25			-
Peroxide Peroxide Peroxide  Correlat Reflux G Revised  12:40 Water R bucket c Bucket C Enthalpy Flask Tc Flask Tc	xide Temperature, F	73.4		0.426		Carrelated lasses, selfmin	457
Peroxide Peroxide  Correlat Reflux G Revised  12:40 Water R bucket c Bucket c Enthalpy  Flask Tc Flask Tc		7 3.4	Gas Flow Rate, gm/min			Correlated losses, cal/min	73
Correlat Reflux C Revised  12:40 Water R bucket c Bucket C	xide Flow Rate, ml/min		Water Vap. gm/min	0.0126		Reflux Gas Delta H, cal/min	
Correlat Reflux G Revised  12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc	xide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	6.98		Revised Acc/generation, cal/min	-114
Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc	xide Enthalpy Change, cal/mi	r 0.0					-
Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc							
Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc			Accumulation/Generation, cal/min	-2568			
Reflux C Revised  12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc							
12:40 Water R bucket c Bucket c Enthalpy Flask Tc Flask Tc	elated losses, cal/min	4575					
12:40 Water R bucket c Bucket c Enthalpy Flask T Flask T	ıx Gas Delta H, cal/min	732					
bucket of Bucket of Enthalpy Flask To Flask To	sed Acc/generation, cal/min	-1140					
bucket of Bucket of Enthalpy Flask To Flask To							
bucket of Bucket of Enthalpy Flask To Flask To							
bucket of Bucket of Enthalpy Flask To Flask To							
bucket of Bucket of Enthalpy Flask To Flask To	er Return Temp, Deg C	6.9	Oil Return Temp, Deg C	79.9			
Enthalpy Flask To	et ck volume, ml	1000	bucket ck volume, ml	1000			
Enthalpy Flask To Flask To	et ck time, sec	56.16	Bucket ck time, sec	96.78			t
Flask To	Flow rate, ml/min		Flow rate, ml/min	620			<u> </u>
Flask To	alpy change, calorie/min:	2030	Enthalpy change, calorie/min:	-4351			
Flask To	any, onlange, calone/illin.	2,000	Entrary onange, calone/mill.	4001			+
Flask To	Ton Surface Tamp C	70.7	Flack bottom Surface Toma C	75.0			-
	Top Surface Temp., C	70.7	Flask bottom Surface Temp., C	75.3			-
Δir lam	k Top Surface Temp., F	159	Flask bottom Surface Temp., F	168			-
	emp. ,F	77	Air Temp. ,F	77			-
		2.7	Overall HT coef.	2.7			-
	all HT coef. Btu/hr/F/sq ft	188	bottom flask Area, in^2	265			1
emisivity	flask Area, in^2	0.94	emisivity	0.94			1
	flask Area, in^2 ivity	1218	Convective Loss, cal/min	1889			
	flask Area, in^2 ivity vective Loss, cal/min	564	Radiative Loss, cal/min	895			
Flask to	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min	1782	Flask bottom Heat Loss, cal/min	2785	4567		
	flask Area, in^2 ivity vective Loss, cal/min						
Reactor	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min	91.5	P1 Gas Temp. Deg C.	27.5			
	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min	31.3	Gas Flow Rate, gm/min	0.223		Correlated losses, cal/min	44
	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min c top Heat Loss, cal/min		Water Vap. gm/min	0.0066		Reflux Gas Delta H, cal/min	38
	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min k top Heat Loss, cal/min otor Temperature, C xide Temperature, F	77		3,65		Revised Acc/generation, cal/min	-4
	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min k top Heat Loss, cal/min ctor Temperature, C xide Temperature, F xide Flow Rate, ml/min	77		9.50			1
reioxide	flask Area, in^2 ivity vective Loss, cal/min ative Loss, cal/min k top Heat Loss, cal/min otor Temperature, C xide Temperature, F	77 <b>0</b> 0.8	P1 loss, H2O vapor, cal/min				

(ujawa 8/18/2003		Heat Balanc	ie T				
0/10/2003		rious Balance	.~				
ST RUN	F-16						
OT IXOIT	Condenser Bath		Oil Bath				
	Condenser Bath		Oli Batti				
	Set Point Temperature, Deg C	5	Set Point Temperature, Deg C	100			
	Set i Sint Temperature, Deg C		Set i dilit i emperature, Deg C	100			
		The heat ha	ance and heat generation calculations a	re verv			
		uncertain	ance and heat generation calculations at	-			
			of physical properties for the heating oil.	Efforts are			
			to determine operating heat capacities a				
		being made	to determine operating near capacities a	na densities.			
			B B0 31 1 3 4 1	0.070			
			Boss DS oil density, gm/ml	0.873			
			Boss DS oil heat cap. cal/gm/deg	0.4			
	Water Return Temp, Deg C	7	Oil Return Temp, Deg C	81.5			
	bucket ck volume, ml	1000	bucket ck volume, ml	1000			
	Bucket ck time, sec	57.66	Bucket ck time, sec	96.54			
	Flow rate, ml/min	1041	Flow rate, ml/min	622			
	Enthalpy change, calorie/min:	2081	Enthalpy change, calorie/min:	-4015			
	Flask Top Surface Temp., C	70.9	Flask bottom Surface Temp., C	75.7			
	Flask Top Surface Temp., F	160	Flask bottom Surface Temp., F	168			1
	Air Temp. ,F	80	Air Temp. ,F	80			
	Overall HT coef. Btu/hr/F/sq ft	2.7	Overall HT coef.	2.7			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			1
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1179	Convective Loss, cal/min	1842			
	Radiative Loss, cal/min	551	Radiative Loss, cal/min	881	4.450		
	Flask top Heat Loss, cal/min	1729	Flask bottom Heat Loss, cal/min	2723	4452		
	Reactor Temperature, C	90.1	P1 Gas Temp. Deg C.	28.5			
	Peroxide Temperature, F	80	Gas Flow Rate, gm/min	0.110		Correlated losses, cal/min	434
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0033		Reflux Gas Delta H, cal/min	18
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	1.80		Revised Acc/generation, cal/min	-51
	Peroxide Enthalpy Change, cal/mir	0.0					
			Accumulation/Generation, cal/min	-2520			
	Correlated losses, cal/min	4342					
	Reflux Gas Delta H, cal/min	189					
	Revised Acc/generation, cal/min	-516					
	Trevised / teo/generation, edi/min						
14:52	Water Return Temp, Deg C	6.9	Oil Return Temp, Deg C	79.8			
	bucket ck volume, ml	1000	bucket ck volume, ml	1000			
	Bucket ck time, sec	55.44	Bucket ck time, sec	96.43			
	Flow rate, ml/min	1082	Flow rate, ml/min				
	Enthalpy change, calorie/min:	2056	Enthalpy change, calorie/min:	-4389			1
							1
	Flask Top Surface Temp., C	65.2	Flask bottom Surface Temp., C	74.4			
	Flask Top Surface Temp., F	149	Flask bottom Surface Temp., F	166			
	Air Temp. ,F	80.6	Air Temp. ,F	80.6			
	Overall HT coef. Btu/hr/F/sq ft	3	Overall HT coef.	3			
	Top flask Area, in^2	188	bottom flask Area, in^2	265			
	emisivity	0.94	emisivity	0.94			
	Convective Loss, cal/min	1131	Convective Loss, cal/min	1978			1
	Radiative Loss, cal/min	463	Radiative Loss, cal/min	847			1
	Flask top Heat Loss, cal/min	1594	Flask bottom Heat Loss, cal/min	2826	4420		1
	. Idon top i leat 2000, califfill	1004	riask sollom rical 2005, cal/IIIIII	2020	4420		+
	Reactor Temperature, C	86.3	P1 Gas Temp. Deg C.	29.5			
						Carrelated leases	10
	Peroxide Temperature, F	80.6	Gas Flow Rate, gm/min	0.042		Correlated losses, cal/min	42
	Peroxide Flow Rate, ml/min	0	Water Vap. gm/min	0.0012		Reflux Gas Delta H, cal/min	_
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss, H2O vapor, cal/min	0.68		Revised Acc/generation, cal/min	,
	Peroxide Enthalpy Change, cal/mir	0.0					
			Accumulation/Generation, cal/min	-2088			
				]			
	Correlated losses, cal/min	4276					
	Reflux Gas Delta H, cal/min	71		1			

S Kujawa						
9/3/20	03			Reactor	r Charge	
TEST RUN	F-22	j				
Component		Mol. Wt.	SURROGATE	Grams	Target Milliliters	Micro L
'	Charge:			150		
water		Į		120.0442	120.04	
hydraulic oil	C26H54	366.7		2.0938	2.38	
cutting oil	C26H64	366.7		2.0938	2.38	
		1				
Al2O3				0.3349	0.08	83.9
CaO				0.5413	0.16	163.0
Cr2O3				0.2326	0.04	44.6
Fe2O3				1.3032	0.44	435.1
MgO				0.7269	0.38	375.9
MnO				0.4254	0.08	82.1
SiO2				8.3907	3.71	3712.7
Na3PO4				12.2584	4.83	4831.8
КОН				0.3224	0.16	157.8
Hg				0.0516	0.00	3.8
Aroclor-1260	C12Cl6.36	373		0.0070	0.0045	4.5
TCE		131		0.8431	0.58	577.5
PCE		166		0.0747	0.05	45.8
TCA		133		0.0941	0.07	70.2
BEHP	C22H38O4	390.54		0.1619	0.17	165.2
	Total:			150.0	135.56	
			REAGENTS			
Component				Grams	Milliliters	Micro L
LIGH	00010	2010				
HCB	C6CI6	284.8				
BP	C12H10	154.2				
FeSO4 7H2O				1.5		
H2O2 (50%)		-		720	600	
` ′				720	100	
H2SO4 (con)						
NaOH (4 M)						
	Total:			871.5		

		}	}	
	Actual			
Grams	Milliliters	Micro L	gmmoles	gmol C
120.382			- 1	
2.073			0.0057	0.1470
2.073			0.0057	0.1470
2.045			0.0000	0.1400
0.3356				
0.5411				
0.2327				
1.3032				
0.7270				
0.4249				
8.3915				
12.2585				
0.3230				
0.0574		4		
			4.455.04	0.0044
0.0428			1.15E-04	0.0014
0.8496		580	0.0065	0.0130
0.0754		46	0.0005	0.0009
0.0950		70	0.0007	0.0014
0.1663		170	0.0004	0.0094
150.3		110	0.0001	0.0001
Γ				
Grams	Milliliters	Micro L		
			2.42E-05	0.0001
0.0069			2.42E-05 2.08E-05	0.0001
0.0032			2.00E-03	0.0002
1.5013				
1.0010				
720	600			
14.1492				
1.933				
887.9				0.3187

	S Kujawa													
	9/3/2003													
	TEST RUN	F-22												
Run Time	Gas Vol, cc	Time ass		Temp, C	P baro	MW	Donaite	arm for in	Time delta	Data aum	Mass delta	Massaum		Rctr T
Kun Time	Gas Voi, cc	Time, sec	accm	remp, C	psia	IAIAA	Density lb/ft^3	gm/min 0		Rate avg gm/min	gm	Mass sum gm		Deg C
					psia		ID/IC 5			ginziniii	yııı	giii		Dogo
8:30		1	0	22	12.13	31.7	0.067	0.000	0.0	0.000	0.00	0.0		82
8:35		16.75	179	21	12.13	32.2	0.069	0.197	5.0	0.099	0.49	0.5		83
8:45		9	333	21	12.13	31.8	0.068	0.363	10.0	0.280	2.80	3.3		85
9:00		7.88	381	21	12.13	31.8	0.068	0.414	15.0	0.389	5.83	9.1		91
9:15		7.75	387	21	12.13	31.8	0.068	0.421	15.0	0.418	6.26	15.4		91
9:30 9:45		7.19 7.22	417 416	21 21	12.13 12.13	31.8	0.068	0.454	15.0	0.438 0.453	6.56 6.79	22.0 28.8		92
10:00		7.22	410	21	12.13	31.8 31.8	0.068	0.452 0.458	15.0 15.0	0.455	6.82	28.8 35.6		92
10:00		7.115	422	21	12.13	31.8	0.068	0.459	15.0	0.458	6.88	42.5		92
10:30		7.69	390	23	12.13	31.8	0.067	0.422	15.0	0.440	6.60	49.1		92
10:45		7.72	389	21	12.13	31.8	0.068	0.423	15.0	0.422	6.34	55.4		92
11:00		8.25	364	22	12.13	31.8	0.068	0.394	15.0	0.409	6.13	61.5		91
11:15		8.22	365	22	12.13	31.8	0.068	0.396	15.0	0.395	5.93	67.5		91
11:30		7.69	390	23	12.13	31.8	0.067	0.422	15.0	0.408	6.12	73.6		91
11:45		7.72	389	24	12.13	31.8	0.067	0.419	15.0	0.420	6.30	79.9		92
12:00		7.59	395	24	12.13	31.8	0.067	0.426	15.0	0.422	6.33	86.2		92
12:15		7.5	400	25	12.13	31.8	0.067	0.429	15.0	0.428	6.41	92.6		92
12:30		7.62 7.56	394	24 25.5	12.13 12.13	31.8	0.067	0.424	15.0	0.427	6.40	99.0 105.4		92
12:45 13:00		7.72	397 389	25.5 26.5	12.13	31.8 31.8	0.067 0.067	0.425 0.415	15.0 15.0	0.425 0.420	6.37 6.30	105.4		92
13:15		7.72	395	26.5	12.13	31.8	0.067	0.415	15.0	0.420	6.28	111.7		92
13:30		7.68	391	27	12.13	31.8	0.067	0.422	15.0	0.419	6.29	124.3		92
13:45		8.53	352	27	12.13	31.8	0.067	0.375	15.0	0.396	5.94	130.2		ì
14:00		9.47	317	29	12.13	31.8	0.066	0.336	15.0	0.355	5.33	135.5		92
14:15		10.82	277	29	12.13	31.8	0.066	0.294	15.0	0.315	4.72	140.3		92
14:30		12.25	245	29	12.13	31.8	0.066	0.260	15.0	0.277	4.15	144.4		91
14:45		13.4	224	29	12.13	31.8	0.066	0.237	15.0	0.248	3.73	148.1		91
15:00		14.37	209	25	12.13	31.8	0.067	0.224	15.0	0.231	3.46	151.6		90
15:15		17.44	172	29	12.13	31.8	0.066	0.182	15.0	0.203	3.05	154.7		90
15:30		19.38	155	29	12.13	31.8	0.066	0.164	15.0	0.173	2.60	157.3		0.0
15:45 16:00		22.34 25.5	134 118	29 29	12.13 12.13	31.8 31.8	0.066	0.143	15.0	0.153 0.134	2.30 2.01	159.6		89 89
16:00		28.72	104	29	12.13	31.8	0.066 0.066	0.125 0.111	15.0 15.0	0.134	1.77	161.6 163.3		89
16:30			91	29	12.13	31.8	0.066	0.097	15.0	0.116	1.56	164.9		89
16:45		7.25	83	29	12.13	31.8	0.066	0.088	15.0	0.092	1.38	166.3		88
17:00		8.47	71	29	12.13	31.8	0.066	0.075	15.0	0.082	1.22	167.5		88
17:15		8.94	67	29	12.13	31.9	0.066	0.071	15.0	0.073	1.10	168.6		88
17:30	10	11.25	53	29	12.13	31.9	0.066	0.057	15.0	0.064	0.96	169.5		88
17:45		11.93	50	28	12.13	31.9	0.066	0.054	15.0	0.055	0.83	170.4		88
18:00		13.37	45	28	12.13	31.9	0.067	0.048	15.0	0.051	0.76	171.1		88
18:15		13.37	45	28	12.13	31.9	0.067	0.048	15.0	0.048	0.72	171.9		88
18:30		16.47	36	28	12.13	31.9	0.067	0.039	15.0	0.043	0.65	172.5		88
18:45		18.69	32	28	12.13	31.9	0.067	0.034	15.0	0.037	0.55	173.0		
19:00		21.44	28 25	28 27	12.13 12.13	31.9	0.067	0.030	15.0	0.032	0.48	173.5		86
19:15 19:30		24.43 30.69	25	25	12.13	31.9 31.9	0.067 0.067	0.026 0.021	15.0 15.0	0.028 0.024	0.42 0.36	174.0 174.3		86
19:30		35.59	24	25	12.13	31.9	0.067	0.021	15.0	0.024	0.35	174.3		85
20:00		32.81	18	23	12.13	31.9	0.067	0.020	15.0	0.023	0.33	174.7		0.
20:15		34.19	18	25	12.13	31.9	0.067	0.020	15.0	0.023	0.34	175.3		87
20:30		33.72	18	25	12.13	31.9	0.067	0.019	15.0	0.019	0.29	175.6		87
		22.11.2	- 10		,,	21.0	5.501	5.510	. 0.0	5.510	3.20			
			204				Avg's:	0.237	720.0			171.0	Avg:	90

	S Kujawa		T						
	9/3/2003								
	9/3/2003								
	TEST RUN	F-22							
	IESI KON	1-22							
Run Time	% O2	% CO2	% H2O	% CO	PPMv TCE	PPMv PCE	PPMv TCA	MW	
ixuii iiiie	/0 OZ	/0 CC2	70 1120	/0 00	TT WIV TOL	I I MIV I OL	TT MIV TOA	10100	
8:30	97.9%	0.0%	2.1%					31.7	
8:35	94.1%	3.8%	2.1%					32.2	
8:45	96.9%	1.0%	2.1%	0.0114%				31.8	
9:00		0.5%	2.1%	0.011470				31.8	
9:15	97.4%	0.5%	2.1%					31.8	
9:30	97.4%	0.5%	2.1%					31.8	
9:45	97.4%	0.5%	2.1%					31.8	
10:00	97.3%	0.6%	2.1%	0.0066%				31.8	
10:00	97.3%	0.6%	2.1%	0.000070				31.8	
10:13	97.3%	0.6%	2.1%					31.8	
10:30	97.2%	0.7%	2.1%					31.8	
11:00	97.3%	0.6%	2.1%					31.8	
11:15		0.6%	2.1%					31.8	
11:30		0.7%	2.1%				<del>                                     </del>	31.8	
11:45	97.3%	0.6%	2.1%	0.0033%				31.8	
12:00		0.6%	2.1%	0.0000 /0				31.8	
12:15		0.6%	2.1%					31.8	
12:30	97.3%	0.6%	2.1%					31.8	
12:45	97.3%	0.6%	2.1%					31.8	
13:00	97.3%	0.6%	2.1%	0.0024%				31.8	
13:15	97.3%	0.6%	2.1%	0.0024 /6				31.8	
13:30	97.3%	0.6%	2.1%					31.8	
13:45	97.3%	0.6%	2.1%	0.0029%				31.8	
14:00	97.3%	0.6%	2.1%	0.002376				31.8	
14:15	97.2%	0.7%	2.1%					31.8	
14:13	97.2%	0.7%	2.1%					31.8	
14:45	97.1%	0.8%	2.1%	0.0051%				31.8	
15:00		0.8%	2.1%	0.000170				31.8	
15:15	97.0%	0.9%	2.1%					31.8	
15:30	97.0%	0.9%	2.1%					31.8	
15:45	96.8%	1.1%	2.1%	0.0092%				31.8	
16:00	96.9%	1.0%	2.1%	0.0032 /0				31.8	
16:15	96.8%	1.1%	2.1%					31.8	
16:30		1.2%	2.1%				<del>                                     </del>	31.8	
16:30	96.7%	1.2%	2.1%					31.8	
17:00	96.7%	1.2%	2.1%				<del>                                     </del>	31.8	
17:15	96.6%	1.3%	2.1%				<del>                                     </del>	31.9	
17:30	96.6%	1.3%	2.1%					31.9	
17:45	96.6%	1.3%	2.1%					31.9	
18:00		1.4%	2.1%					31.9	
18:15		1.4%	2.1%					31.9	
18:30	96.4%	1.5%	2.1%				<del>                                     </del>	31.9	
18:45	96.4%	1.5%	2.1%					31.9	
19:00	96.3%	1.6%	2.1%					31.9	
19:15	96.3%	1.6%	2.1%					31.9	
19:30		1.6%	2.1%				<del>                                     </del>	31.9	
19:45		1.6%	2.1%					31.9	
20:00	96.1%	1.8%	2.1%				<del>                                     </del>	31.9	
20:00	96.1%	1.8%	2.1%				<del>                                     </del>	31.9	
20:30	96.0%	1.9%	2.1%					31.9	

T	S Kujawa													
	8/27/2003													
	5,21,2003													
	TEST RUN	F-22												
	Instantaneous rate							Integrated qu						
	O2, gm/min	CO2, g/m	H2O g/m	CO g/m	TCE g/m	PCE g/m	TCA g/m	O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gm
8:30	0.0000	0.0000	0.0000	0.00E+00	0.00E+00	0.0000	0.0000	0.000	0.000	0.000	0.000	0.000	0.00E+00	0.00E+
8:35	0.1847	0.0000	0.0023	0.00E+00	0.00E+00	0.0000	0.0000	0.000	0.000	0.006	0.000	0.000	0.00E+00	0.00E+
8:45	0.3539	0.0050	0.0023	3.64E-05	0.00E+00	0.0000	0.0000	3	0.020	0.0	0.000	0.000	0.00E+00	0.00E+
9:00	0.4064	0.0029	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		0.2	0.1	0.000	0.000	0.00E+00	0.00E+
9:15	0.4132	0.0029	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		0.2	0.2	0.000	0.000	0.00E+00	0.00E+
9:30	0.4454	0.0031	0.0054	0.00E+00	0.00E+00	0.0000	0.0000		0.3	0.3	0.000	0.000	0.00E+00	0.00E+
9:45	0.4435	0.0031	0.0054	0.00E+00	0.00E+00	0.0000	0.0000		0.3	0.3	0.000	0.000	0.00E+00	0.00E+
10:00	0.4486	0.0038	0.0055	2.66E-05	0.00E+00	0.0000	0.0000		0.3	0.4	0.001	0.000	0.00E+00	0.00E+
10:15	0.4496	0.0038	0.0055	0.00E+00	0.00E+00	0.0000	0.0000		0.4	0.5	0.001	0.000	0.00E+00	0.00E+
10:30	0.4132	0.0035	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		0.5	0.6	0.001	0.000	0.00E+00	0.00E+
10:45	0.4139	0.0041	0.0051	0.00E+00	0.00E+00	0.0000	0.0000		0.5	0.7	0.001	0.000	0.00E+00	0.00E+
11:00	0.3864	0.0033	0.0047	0.00E+00	0.00E+00	0.0000	0.0000		0.6	0.7	0.001	0.000	0.00E+00	0.00E+
11:15	0.3878	0.0033	0.0047	0.00E+00	0.00E+00	0.0000	0.0000	66	0.6	0.8	0.001	0.000	0.00E+00	0.00E+
11:30	0.4127	0.0041	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		0.7	0.9	0.001	0.000	0.00E+00	0.00E+
11:45	0.4102 0.4172	0.0035 0.0035	0.0050	1.22E-05	0.00E+00	0.0000	0.0000		0.7 0.8	1.0	0.001	0.000	0.00E+00	0.00E+
12:00 12:15	0.4172	0.0035	0.0051 0.0051	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.0000 0.0000	0.0000		0.8	1.0	0.001	0.000 0.000	0.00E+00 0.00E+00	0.00E+
12:15	0.4206	0.0036	0.0051	0.00E+00	0.00E+00	0.0000	0.0000		0.9	1.1	0.001	0.000	0.00E+00	0.00E+
12:30	0.4168	0.0035	0.0051	0.00E+00	0.00E+00	0.0000	0.0000		0.9	1.3	0.001	0.000	0.00E+00	0.00E+
13:00	0.4067	0.0033	0.0050	8.78E-06	0.00E+00	0.0000	0.0000	109	1.0	1.3	0.001	0.000	0.00E+00	0.00E+
13:15	0.4132	0.0035	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		1.1	1.4	0.001	0.000	0.00E+00	0.00E+0
13:30	0.4082	0.0035	0.0050	0.00E+00	0.00E+00	0.0000	0.0000		1.1	1.5	0.001	0.000	0.00E+00	0.00E+0
13:45	0.3675	0.0031	0.0045	9.59E-06	0.00E+00	0.0000	0.0000	128	1.2	1.6	0.001	0.000	0.00E+00	0.00E+0
14:00	0.3288	0.0028	0.0040	0.00E+00	0.00E+00	0.0000	0.0000	133	1.2	1.6	0.001	0.000	0.00E+00	0.00E+0
14:15	0.2875	0.0028	0.0035	0.00E+00	0.00E+00	0.0000	0.0000	137	1.2	1.7	0.001	0.000	0.00E+00	0.00E+
14:30	0.2540	0.0025	0.0031	0.00E+00	0.00E+00	0.0000	0.0000		1.3	1.7	0.001	0.000	0.00E+00	0.00E+
14:45	0.2319	0.0026	0.0028	1.07E-05	0.00E+00	0.0000	0.0000		1.3	1.8	0.001	0.000	0.00E+00	0.00E+
15:00	0.2192	0.0025	0.0027	0.00E+00	0.00E+00	0.0000	0.0000	148	1.4	1.8	0.001	0.000	0.00E+00	0.00E+
15:15	0.1780	0.0023	0.0022	0.00E+00	0.00E+00	0.0000	0.0000		1.4	1.8	0.001	0.000	0.00E+00	0.00E+
15:30	0.1602	0.0020	0.0020	0.00E+00	0.00E+00	0.0000	0.0000		1.4	1.9	0.001	0.000	0.00E+00	0.00E+
15:45	0.1387	0.0022	0.0017	1.15E-05	0.00E+00	0.0000	0.0000	156	1.5	1.9	0.002	0.000	0.00E+00	0.00E+
16:00	0.1216	0.0017	0.0015	0.00E+00	0.00E+00	0.0000	0.0000	158	1.5	1.9	0.002	0.000	0.00E+00	0.00E+
16:15	0.1079	0.0017	0.0013	0.00E+00	0.00E+00	0.0000	0.0000		1.5	2.0 2.0	0.002	0.000	0.00E+00	0.00E+
16:30 16:45	0.0938 0.0854	0.0016 0.0015	0.0012 0.0010	0.00E+00 0.00E+00	0.00E+00 0.00E+00	0.0000 0.0000	0.0000		1.5 1.6	2.0	0.002 0.002	0.000	0.00E+00 0.00E+00	0.00E+ 0.00E+
17:00	0.0854	0.0015	0.0010	0.00E+00	0.00E+00	0.0000	0.0000		1.6	2.0	0.002	0.000	0.00000	0.000+
17:00	0.0692	0.0012	0.0009	0.00E+00	0.00E+00	0.0000	0.0000		1.6	2.0	0.002	0.000	0.00E+00	0.00E+
17:30	0.0550	0.0013	0.0003	0.00E+00	0.00E+00	0.0000	0.0000		1.6	2.0	0.002	0.000	0.00000	0.000
17:45	0.0520	0.0010	0.0007	0.00E+00	0.00E+00	0.0000	0.0000		1.6	2.0	0.002	0.000	0.00E+00	0.00E+
18:00	0.0464	0.0009	0.0006	0.00E+00	0.00E+00	0.0000	0.0000		1.6	2.0	0.002	0.000	0.00000	0.000
18:15	0.0464	0.0009	0.0006	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00E+00	0.00E+
18:30	0.0376	0.0008	0.0005	0.00E+00	0.00E+00	0.0000	0.0000	169	1.7	2.1	0.002	0.000	0.00000	0.000
18:45	0.0331	0.0007	0.0004	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00E+00	0.00E+
19:00	0.0288	0.0007	0.0004	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.000
19:15	0.0254	0.0006	0.0003	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00E+00	0.00E-
19:30	0.0204	0.0005	0.0003	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.000
19:45	0.0245	0.0006	0.0003	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.000
20:00	0.0191	0.0005	0.0002	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.00
20:15	0.0182	0.0005	0.0002	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.00
20:30	0.0185	0.0005	0.0002	0.00E+00	0.00E+00	0.0000	0.0000		1.7	2.1	0.002	0.000	0.00000	0.000
								O2, gm	CO2, gm	H2O gm	CO gm	TCE gm	PCE gm	TCA gr
								Sum of compo	ments=	175,58				
										VOC := == ( ) (	20.4-4	0.000	0.000	
										VOC in gas/ VO	JC rea	0.00%	0.00%	0.00

S Kujawa									
9/3/2003				Test Results	Str RPM:	444	Start		
						516			
TEST RUN	F-22								
TEOT NON	Results								
	Product slurry Sp. Gr.:	1.04							
	Final Product Slurry, ml:	686							
	Tillari Todact Clairy, IIII.	000							
	Final Product Slurry, gm:	710.7							
	Dewar Flask net wt., gm	0.9854							
	Liquid/slurry Product, gm:	711.7		(Slurry Wt, 100% H2O2/O2 RXN):	719				
	Elquid/Siurry Froduct, giri.	711.7		(Siulty VVI, 100% H2O2/O2 KXIV).	7 19			<b>—</b>	
	Due divist Care Mariable anno	175.6							
	Product Gas Weight, gm:	175.6						<b>-</b>	
	Du - du - 4 34/4	887.3							
	Product Wt, gm:	887.3						-	
								-	
	Total Charge Weight, gm:	887.9						-	
	O							-	
	Overall Mass Balance	00.50							
	Mass Balance Closure:	99.9%							
	Mass balance w/o gas:	80%						<b>—</b>	
	Species Mass Results			Species Mass Results					
	TriChloroEthylene			HexachloroBenzene		Anal. code			
	Slurry analysis, 1, mg/kg:	1.950		Slurry analysis, 1, mg/kg					
	Slurry analysis, 2, mg/kg:	1.440	J	Slurry analysis, 2, mg/kg		U			
	Avg., mg/kg			Avg., mg/k				l	
	Total, mg:	1.205		Total, mg:	1.930			l	
								1	
	TCE, DRE, %	99.86%		HCB, DRE, %	72.04%			1	
	TetraChloroEthylene			Bi-Phenyl					
	Slurry analysis, 1, mg/kg:	1.950	U	Slurry analysis, 1, mg/kg	1: 4.920	U			
	Slurry analysis, 2, mg/kg:	1.060	J	Slurry analysis, 2, mg/kg	1: 4.760	U			
	Avg., mg/kg	1.505		Avg., mg/k					
	Total, mg:	1.070		Total, mg:	3,440				
	PCE, DRE, %	98.58%		BP, DRE, %	-7.49%		Run time:	12	Hours
		1			T		Run Temp		deg C
	1,1,1-TriChloroEthane			Aroclor 1260			H2O2 vol:		mi
	Slurry analysis, 1, mg/kg:	1.950	U	Slurry analysis, 1, mg/kg	1: 6.600				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	Slurry analysis, 2, mg/kg:	1.990		Ciarry anarysis; 1, mg/kg	9. 0.000				
	Avg., mg/kg		-	Avg., mg/k	a 6.600				
	Total, mg:	1.400		Total, mg:	4.691				
		1.430		. cont, mg.	7.001				
	TCA, DRE, %	98.53%		Aroclor, DRE, %	89.04%				
	107, 51, 2, 70			7.100.01, 5112, 70	7 00.0470			<b>—</b>	
	BEHP				+				
	Slurry analysis, 1, mg/kg:	33.800	R		+				
	Slurry analysis, 1, mg/kg. Slurry analysis, 2, mg/kg:	17.700			+				
	Siurry analysis, 2, mg/kg. Avg., mg/kg		ا ا		+			<b>—</b>	
	Total, mg:	18.301			+				
	rotal, mg.	10.301			+			<del>                                     </del>	
	DELLO DOE 0/	00.000						-	
	BEHP, DRE, %	89.00%							
		1				l		i .	
								-	

S Kujawa						
9/3/2003		Heat Balance	)			
0,0,200						
TEST RUN	F-22					
	Condenser Bath			Oil Bath		
	Set Point Temperature, Deg C	5	Set Poi	nt Temperature, Deg C	100	
	1 , 3			, ,		
	No heat balance data			generation calculations are very unce		
	collected for run F-22.			erties for the heating oil. Efforts are I	peing made to	
	Collected for full 1 -22.			apacities and densities.		
		STK 8/12/2	003			
			Boss D	S oil density, gm/ml	0.873	
			Boss D	S oil heat cap. cal/gm/deg C	0.4	
10:45	Water Return Temp, Deg C		Oil Retu	ırn Temp, Deg C		
	bucket ck volume, ml	1000	bucket	ck volume, ml	1000	
	Bucket ck time, sec		Bucket	ck time, sec		
	Flow rate, ml/min	#DIV/0!		Flow rate, ml/mir	n #DIV/0!	
	Enthalpy change, calorie/min:	#DIV/0!	Enthalp	y change, calorie/min:	#DIV/0!	
				-		
	Flask Top Surface Temp., C		Flask b	ottom Surface Temp., C		
	Flask Top Surface Temp., F	32	Flask b	ottom Surface Temp., F	32	
	Air Temp. ,F		Air Tem	ıp. ,F	0	
	Overall HT coef. Btu/hr/F/sq ft	2.75	Overall	HT coef.	2.75	
	Top flask Area, in^2	188	bottom	flask Area, in^2	265	
	emisivity	0.94	emisivit		0.94	
	Convective Loss, cal/min	483	Convec	tive Loss, cal/min	680	
	Radiative Loss, cal/min	122	Radiativ	/e Loss, cal/min	172	
	Flask top Heat Loss, cal/min	605	Flask b	ottom Heat Loss, cal/min	852	
	Reactor Temperature, C		P1 Gas	Temp. Deg C.		
	Peroxide Temperature, F	0	Gas Flo	ow Rate, gm/min		
	Peroxide Flow Rate, ml/min	2		/ap. gm/min	0.0000	
	Peroxide heat Cap, cal/gm/degC	0.8	P1 loss	, H2O vapor, cal/min	0.00	
	Peroxide Enthalpy Change, cal/min	34.1				
			Accum	ulation/Generation, cal/min	#DIV/0I	

S Kujawa		T T						
8/27/2003								
0/2/1/2003								
TEST RUN	F-22							
IESTRUN	F-22							
H2O2 TO O2	Residual H2O2 in flask							
gm	gm							
0.0								
1.0 6.7								
18.8								
31.9								
45.6								
59.7		+						-
74.0		+						
88.3		+		-				
102.0		+						-
115.2								-
128.0		+						
140.3								
153.1 166.2								
179.4								
192.7								
206.0								
219.3								
232.4	444.5							
245.5	114.5							
258.6	101.4							
271.0	89.0							
282.0	78.0							
291.9	68.1 59.5							
300.5	51.8							
308.2 315.4	44.6							
321.8	38.2							
327.2 331.9	32.8 28.1							
331.9	28.1	+						
339.7 342.9	20.3 17.1	+					-	-
345.8	14.2 11.7	+		-			-	-
348.3 350.6	9.4							-
352.6	7.4	+						-
354.3	5.7							
355.8	4.2							-
357.3	2.7	+		-				
358.7	1.3							
359.8	0.2	+						-
360.8	-0.8	+					-	-
361.6	-0.8 -1.6	+						
362.4	-1.6 -2.4	+						-
	-2.4 -3.1							
363.1 363.8	-3.1 -3.8	+					-	-
		+						-
364.4 364.9	-4.4 -4.9							
1 304.9	-4.9	1		1	1	I	I	1